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ABSTRACT

The system approach to planning and managing educational change features the use of an adaptive framework and a strategy for planned system change. The approach focuses management attention upon (1) relevant future states of expectation or goals, (2) present and future state variables and contexts, (3) human organization factors, and (4) alternative programs that can be implemented to facilitate goal attainment and change. This document discusses the design, dimension, and utility of an adaptive framework model that can be refined to accommodate the unique attributes of specific educational agencies and the target populations they serve. Based on, and incorporating, the work of many behavioral scientists and the constructive criticisms and suggestions of many educational managers, this model hopefully will provoke constructive reactions toward the development of more efficient and effective management techniques for public education. Work reported herein was performed pursuant to an ESEA Title III grant. (A related document is EA 003 246.) (Author/LLR)

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A SYSTEM APPROACH TO PLANNED CHANGE IN EDUCATION

Volume I. An Adaptive Framework for Public Education and Educational Management

by

Donald R. Miller

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August 1970

PREFACE

One point of pride shared by many managers of public and private enterprise in the United States is that our form of society has produced more benefits for more people than any other form of society in the history of the world. One of the most discouraging aspects of our societal progress is the great disparity which exists among population segments with respect to sharing the benefits produced. In an effort to secure a more equitable share of these benefits, members of deprived population segments are using political power to secure compensating public services. Realizing that resources are limited and faced with public demands for additional services, public enterprises are being forced to implement more efficient and effective management techniques in an effort to conserve available resources and improve the quantity and quality of public services.

The implementation of new management techniques in public enterprise necessitate planned change within the dynamic contexts of those societal organizations which are involved in the enterprise. Probably the most promising organizational renewal technique involves the use of a system approach. This approach is a scientifically-derived methodology for planning and managing change. The method features the use of an adaptive framework and a strategy for planned system change. The system approach is future oriented and time bound in the sense that it focuses management attention upon relevant future states of expectation or goals, present and future state variables and contexts, human organization factors and

alternative programs that can be implemented to facilitate goal attainment and change.

Since trends in organizational renewal seem to favor the use of a system approach, OPERATION PEP focused its attention on the development of generic adaptive frameworks and strategies for planned educational system change. An Adaptive Framework for Public Education and Educational Management was designed to include educational change parameters relevant to effecting planned change in K-12 public school districts. In its present form, this adaptive framework is offered as a tentative model that can be refined to accommodate the unique multi-dimensional attributes of specific educational agencies and the target populations which they serve. The adaptive framework is based on and incorporates the work of many behavioral scientists and the constructive criticisms and suggestions of many educational managers. It is hoped that it will provoke constructive reactions toward the development of more efficient and effective management techniques for public education.

The author wishes to recognize the influential effect that OPERATION PEP participants have had on the final form of this document. The influence of the author's personal association with Rensis Likert and John Evans is recognized and appreciated. In addition, the author appreciatively acknowledges the assistance of Virginia Carroll, Ted M. Rogers, Lynne Svenning, Allen Buckner, Sheldon Varney, Richard Wehe, Margaret Burke and others on the staff of OPERATION PEP who assisted in the design and production of this document. Suggestions for the improvement and/or revision of the adaptive framework will be sincerely appreciated by the author.

Donald R. Miller

Burlingame, California
August 1970

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CHAPTER 1

A SYSTEM APPROACH TO PLANNED CHANGE

Introduction

Change is an inevitable condition of being for an individual or an organization situated in an evolving societal and environmental context. Some types of change take place gradually as the individual or the organization adjusts in response to evolutionary changes occurring in its surroundings. Other types of contextual change necessitate relatively rapid responses on the part of an individual or an organization if it desires to survive. Regardless of type, change is a continuous vital process and is subject always to various forms of natural and human regulation. In complex societal enterprises such as public education, human regulation usually takes the form of deliberate planning and management action.

Since the future of our society cannot be left to chance, multi-level, multi-organizational systems of public education were established and are maintained to conserve and transmit past learning to new generations. These systems are expected to develop, install and operate educational programs which are designed and managed to satisfy the specific ecosystemization, acculturation and socialization needs of individual members of society. In an effort to become more efficient and effective in the conservation and transmission of learning in relation to these needs, our society has developed highly systematized states-of-the-arts in information, education

and learning technology.

The population and knowledge explosions and the technological and sociological revolutions have accentuated society's need to develop new forms of educational systems and organizations and more responsive educational programs. To be effective in a rapidly changing societal and environmental context, educational systems and their respective component organizations must realize the need for continuous renewal and develop adaptive mechanisms which facilitate the systematic planning and management of change. Such adaptive mechanisms should take the form of carefully integrated problem-finding and problem-solving groups made up of broadly-representative, intuitive, insightful and interdisciplinary individuals. Each ad hoc group formed should operate as a somewhat autonomous unit in a federated planning and management system. The activities and tenure of a specific group should depend upon its explicitly stated purposes and its defined universe of organizational concern. A group's entire capability and efforts should be directed toward the end of finding and solving critical problems and conflicts which arise between present and required future organizational practices, performance and outputs. Therefore, each group is concerned with appraising probable future environmental contexts, assessing societal needs and determining educational change requirements in relation to the strategic plans of the organization and its present practices, performance and outputs.

One of the most promising organizational renewal techniques which can be used by problem-finding and problem-solving groups is a system approach. This approach is a scientifically-derived methodology for planning and managing change. The methodology features the use of an adaptive framework and a strategy for planned system change. A strategy

for planned system change should provide for the continuous use of system analysis, synthesis and evaluation procedures. The system approach is future oriented and time bound in the sense that it focuses management attention upon future states of expectation or goals, present and future state variables and contexts, human organization factors and alternative programs that can be implemented to facilitate goal attainment and change.

Basic System-Environment Relations

In its most general form, a model of basic system-environment relations, reveals six interrelated system-environment concepts; namely, environment, system, valued targets, outputs, inputs and feedback control (Figure 1). Each of these concepts can be specifically related to planned change in an instructional system. The environment is a complex of physical, biological, cultural, societal, organizational and ecological factors which surround the system, interact with it and influence its behavior. The instructional system consists of interactions and interrelations between and among six critical components: (1) the learner, (2) the teacher, (3) the curriculum, (4) the relevant methods-means-media, (5) the learning environment and (6) the learning.

Valued targets are future-oriented states of expectations, goals, objectives, needs, problems and/or demands that generate forces for instructional change. Such targets establish significant relations between an instructional system and its environment and predicate the system's purposes and output requirements. Outputs are goal-oriented products, services and/or benefits that the system produces and/or effects as a result of its performance. Inputs, on the other hand, are resources,

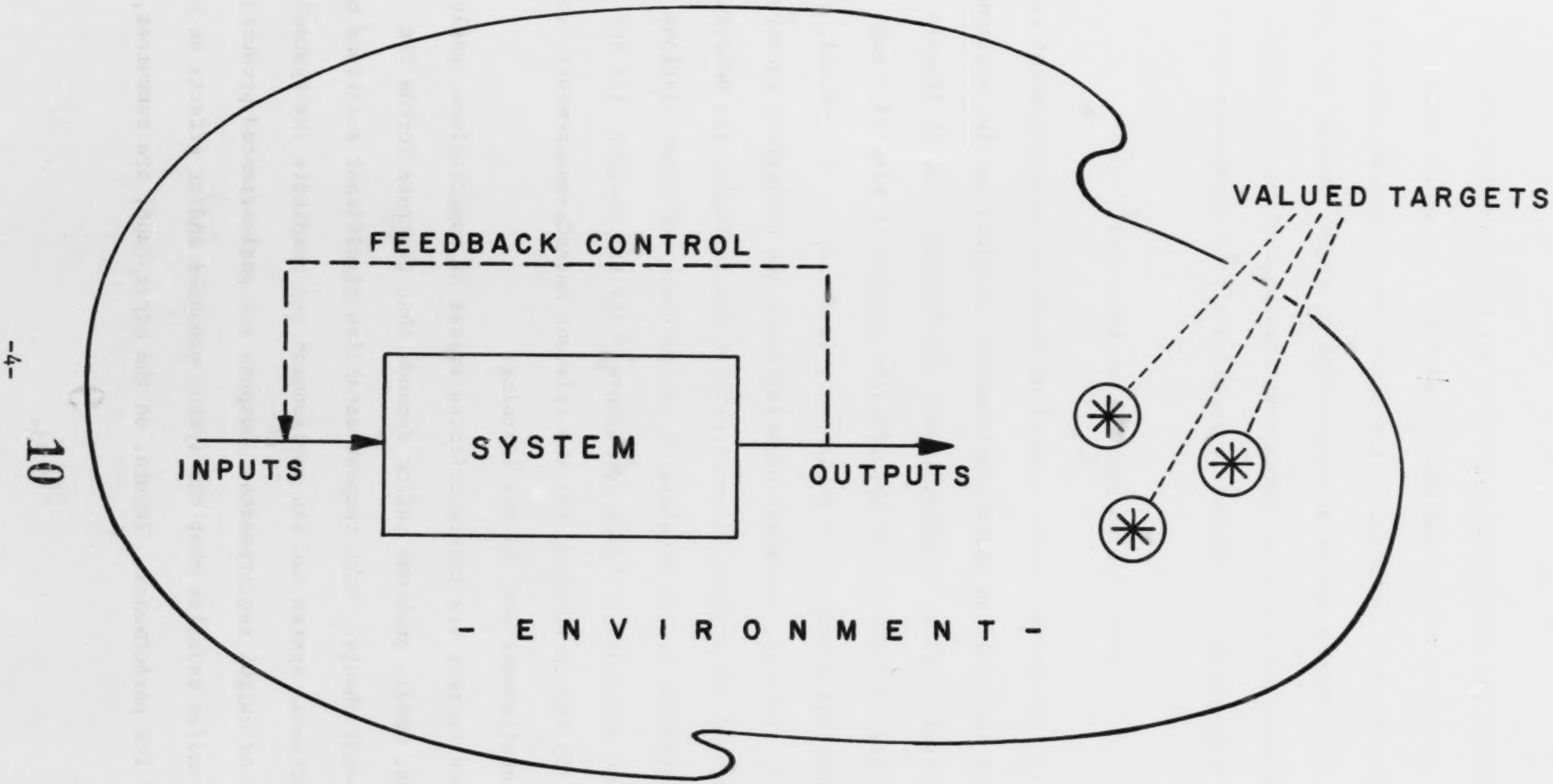

Figure 1. A Model of Basic System-Environment Relations

energy and information which are used to maintain the system or are transformed into instructional outputs.

Feedback control refers to a preferred type of regulatory mechanism for an instructional system. The mechanism establishes a means by which the system and each individual in it may exercise self-direction, self-evaluation and self-correction relative to instructional purposes, practices, performance and outputs. Output and performance control elements (specifications and criteria) are developed in terms of significant system-environment relations and transactions, valued societal targets, system purposes (goals and objectives) and plans subject to existing systemic and environmental situations and conditions. Control elements are used to establish (for each desired change) minimal, optimal and ideal levels of expectation in achievement and standards that can be used to judge their adequacy. As deviations from the optimal course of planned change occur, they can be detected and suitable corrections can be made in performance and/or in the plans.

The feedback control mechanism establishes a "closed-loop" pattern of relations in the system by transferring information regarding the quality of outputs back along the feedback loop and comparing it with information available to the system and/or individuals as inputs. This feedback process enables an instructional system and/or its individual members to regenerate their performance; that is, to continuously improve the quality of their performance and related outputs by recycling interim achievements toward the attainment of desired and/or satisfactorily optimized levels of expectation. Feedback control processes function as self-regulating mechanisms for the instructional system by facilitating the self-direction, self-evaluation and self-correction of individual

and systemic performance.

Basic Considerations and Essential Activities in the Analysis, Synthesis and Evaluation of Systems

As stated previously, a system approach is a scientifically-derived methodology that features the use of both an adaptive framework and a strategy for planned system change. Before one attempts to develop either an adaptive framework or a related strategy for planned system change, he must secure a functional knowledge of the basic considerations and the essential activities which underlie system analysis, synthesis and evaluation.

Basic Considerations in System Analysis, Synthesis and Evaluation

A model of System-Environment Relations (Figure 1) was used as a referent to present relevant concepts and aspects of an instructional system. It will be used as a referent also to present several relevant aspects of system analysis, synthesis and evaluation. Each of these aspects and the activities related to them are constrained by the spatio-temporal dimensions of the system being considered. Educational systems, organizations and programs are dynamic and can be defined to exist in specific change contexts that are portions of larger systems and/or environments. A change context has definite spatio-temporal distributions and boundaries. The nature and qualities of a specific context will change in accord with changes in system and/or environment relations, actions, patterns and structures.

A change context is a multi-dimensional unit of human organization,

activity, space and time which is selected as the object for analysis, synthesis and/or evaluation. The unit can be explained in terms of its parts or components (structures), its internal relations and dependencies (patterns), and its characteristic goal-directed functions or activities (actions). A context is a verifiable unit of change that may encompass a specific portion of a system (systemic context), or a portion of an environment (environmental context), or adjacent, related portions of a particular system and its environment (systemic-environmental context). Any context can be defined and treated as a system for purposes of analysis, synthesis and evaluation. It is a change field or area of concern (usually need and/or problem related) that is designated in relation to a particular set of variables and/or phenomena to be investigated. It can be described and verified in terms of its inherent situations, conditions and characteristics. The model of basic system-environment relations can be used to visualize the theoretical location of the various types of context in perspective.

The points-of-view used in the analysis of systems containing human organization are outlined in Figure 2. Opposite each of the seven major points-of-view listed in the left-hand column are two columns in which the general and specific aspects of the respective system points-of-view are cited. Each aspect can be analyzed in terms of human organization capability, involvement, interaction-influence and accountability factors. For example, one can analyze the political aspects of system-environment input and output transactions in terms of human organization capability factors. The number and types of analytical studies which can be generated using the system points-of-view and human organization factors cited in the matrix are quite extensive. The purpose of analysis is to

FIGURE 2

SYSTEM ANALYSIS POINTS-OF-VIEW

POINTS-OF-VIEW	CAPABILITY -- INVOLVEMENT INTERACTION-INFLUENCE -- ACCOUNTABILITY	
	GENERAL	SPECIFIC
SYSTEM-ENVIRONMENT RELATIONS	EXTRA- AND INTER-SYSTEM RELATIONS INPUT AND OUTPUT TRANSACTIONS	POLITICAL LEGAL SOCIAL ECONOMIC TECHNICAL
SYSTEM CLASSIFICATION SCHEMES	PURPOSES FUNCTIONS RELATIONS STRUCTURES ACTIONS	MODELS ADAPTIVE FRAMEWORKS TAXONOMIES HIERARCHIES PLANS PROGRAMS
SYSTEM COMPONENTS (STRUCTURES)	ESSENTIAL STRUCTURES SUPPLEMENTARY STRUCTURES	ROLES, NORMS & VALUES MAN, MACHINES, MATERIEL, MONEY & FACILITIES
SYSTEM MORPHOLOGY (PATTERNS)	INTRA-SYSTEM RELATIONS AND DEPENDENCIES	PART ⟷ PART PART ⟷ SYSTEM
SYSTEM PHYSIOLOGY (ACTIONS)	MAINTENANCE & SUPPORT PRODUCTION REGULATION & RENEWAL } INPUT-OUTPUT TRANSFORMATIONS DYNAMICS & HOMEOSTASIS	LEGISLATIVE EXECUTIVE MANAGERIAL OPERATIONAL } ACTIVITIES
SYSTEM SPATIAL DISTRIBUTION	TERRITORIES BOUNDARIES OR LIMITS HORIZONS	ENVIRONMENTAL SOCIETAL ORGANIZATIONAL
SYSTEM TEMPORAL DISTRIBUTION	PERIODS BOUNDARIES OR LIMITS HORIZONS	REAL TIME MILESTONE EVENTS SHORT, INTERMEDIATE AND LONG RANGE

logically breakdown the system and secure the relevant information necessary to describe the present nature, qualities and behavior of the system and, hopefully, to predict its probable future nature, qualities and behavior.

System synthesis points-of-view are delineated in Figure 3. Each point-of-view can be regarded as a postulate for the integration of a real or conceptual system. The system analysis points-of-view and human organization factors cited in Figure 2 can be used also as general synthesis referents. These basic considerations should be brought into focus in terms of the defined pattern-maintenance and tension management, goal-attainment, integration and adaptation requirements of the system.[1] Pattern-maintenance and tension management are both related to a system's functional requirement to maintain the integrity of an institutionalized value system. Pattern-maintenance requirements are defined in terms of cultural sources of change while tension management requirements are defined relative to motivational sources of change. Goal-attainment requirements are requisite conditions for system practice, performance and outputs which are defined relative to a specific system's present state and its future states of expectation. Integration requirements are requisite system conditions which define the nature and qualities of the interrelatedness of the system's many parts within the whole. Adaptation requirements are requisite conditions which must be met, managed and/or maintained to assure that the system is held in a flexible state that facilitates renewal through planned system change.

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[1]For an elaboration of these four system requirements, see Talcott Parsons and Neil J. Smelser, Economy and Society (New York: The Free Press, 1956), pp. 16-19.

FIGURE 3

SYSTEM SYNTHESIS POINTS-OF-VIEW*

1. THE WHOLE IS PRIMARY AND THE PARTS ARE SECONDARY.

2. INTEGRATION IS THE CONDITION OF THE INTERRELATEDNESS OF THE MANY PARTS WITHIN ONE.

3. THE PARTS SO CONSTITUTE AN INDISSOLUBLE WHOLE THAT NO PART CAN BE AFFECTED WITHOUT AFFECTING ALL OTHER PARTS.

4. PARTS PLAY THEIR ROLE IN LIGHT OF THE PURPOSE FOR WHICH THE WHOLE EXISTS.

5. THE NATURE OF THE PART AND ITS FUNCTION IS DERIVED FROM ITS POSITION IN THE WHOLE AND ITS BEHAVIOR IS REGULATED BY THE WHOLE TO PART RELATIONSHIP.

6. THE WHOLE IS ANY SYSTEM OR COMPLEX OR CONFIGURATION OF ENERGY AND BEHAVES LIKE A SINGLE PIECE NO MATTER HOW COMPLEX.

7. EVERYTHING SHOULD START WITH THE WHOLE AS A PREMISE AND THE PARTS AND THEIR RELATIONSHIPS SHOULD EVOLVE.

* POINTS-OF-VIEW 1-7 ARE POSTULATES IN A THEORY OF INTEGRATION POSED BY L. THOMAS HOPKINS, INTEGRATION: ITS MEANING AND APPLICATION (NEW YORK: APPLETON-CENTURY-CROFTS, INC., 1937), PP. 36-49.

Capability, involvement, interaction-influence and accountability are four categories of human organization factors that must be included as basic considerations in the analysis, synthesis and evaluation of systems. The capability of an organization is its potential and practical ability to attain its purposes through deliberate action. It is sensitively dependent upon the quantity and quality of the human beings who are involved in the organization's purposive efforts. Their unique backgrounds, training, experiences and competencies critically limit organizational capability.[2] One can study capability in terms of: (1) available inputs, (2) production, renewal and maintenance and support processes, (3) regulatory or feedback control processes and (4) required outputs.

An organization depends upon the involvement of individual human beings to accomplish its purposes. As an organizational factor, it possesses two elements: first, the deliberate act of bringing individuals into contact with the organization, making them aware of organizational functions and purposes, motivating them to become interested and to evaluate the relative advantages of involvement; and second, drawing individual human beings into the organization and facilitating their participation in its activities. The most critical aspect of human involvement is participation in decision-making activities. Involvement in decision making requires the processing of information and the exercising of choice. In this regard, Engler asked:

1. Who . . . gets into the act, and how are they to be involved in providing, receiving, and processing information?

---

[2]For a more complete discussion of human asset accounting and the productive capability of human organizations, see Rensis Likert The Human Organization: Its Management and Value (New York: McGraw-Hill Book Company, 1967), pp. 146-155.

2. What . . . units for the processing of information by people--specialists and generalists--need to be created and how should they be "checked and balanced" . . . ?
3. How will these units . . . account for such functions as: deliberation and debate; negotiation and voting; execution of decisions?
4. How is special expertise made relevant, and how are technical standards decided upon, enforced, modified, influenced by non-specialists, etc.?
5. How is "judicial review" performed relative to the rules for operating such a system of social mechanisms?[3]

Interaction-influence is a term used by Rensis Likert to refer to a system of interacting, interrelated and interdependent organizational characteristics and processes.[4] The nature of these characteristics and processes is determined by the organizational and management theory used and the motivational forces harnessed by the organization. These characteristics and processes operate as a system which serves to coordinate, integrate and guide the goal-directed activities of the organization and all its members. Likert presents the following characteristics and processes in an organization's interaction-influence system: (1) structure, (2) observational and measurement processes, (3) communication processes, (4) decision-making processes, (5) action resources to carry out decisions and energy sources used by them, (6) influence processes, and (7) attitudinal dimensions and motivational characteristics.[5] These organizational characteristics and processes

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[3]U.S. Congress, Senate Special Subcommittee on Utilization of Scientific Manpower of Committee on Labor and Public Welfare, 90th Congress, 1st Session, 1967, by Richard E. Engler, Jr., Human Sciences Research, Inc., McLean, Virginia.

[4]For a detailed description of interaction-influence, see Rensis Likert New Patterns of Management (New York: McGraw-Hill Book Company, 1961), pp. 178-191

[5]Ibid.

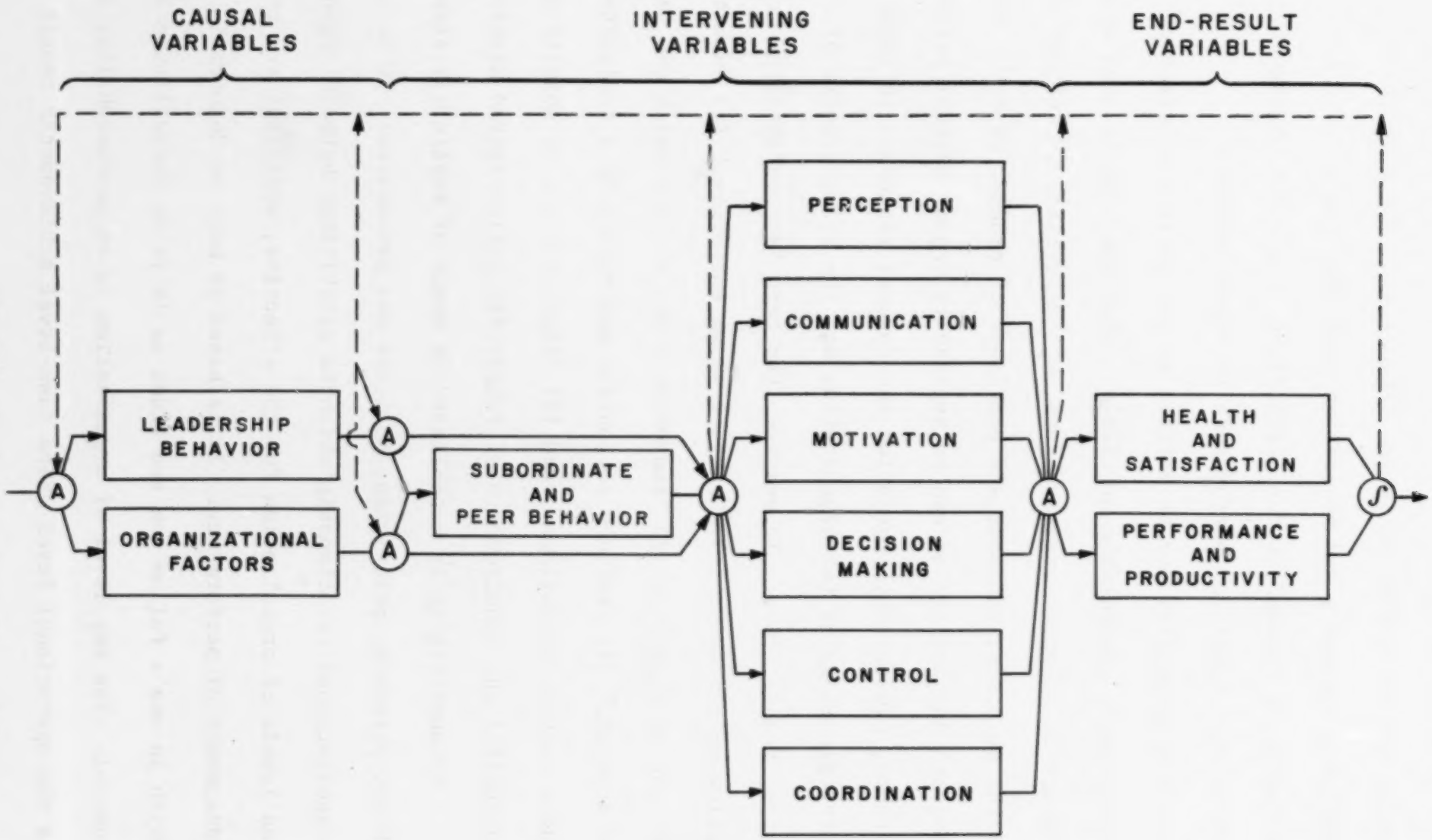
have been incorporated in a model of relations between causal, intervening and end-result variables (Figure 4). The model is a valuable analysis, synthesis and evaluation tool that can be used at and sequentially throughout the legislative, executive, managerial and operational levels of performance in organizations.

Accountability may be defined as the quality or state of being accountable, responsible or liable. When the term is used as a renewal concept in adaptive organizations, accountability is defined relative to the purposes, products and processes of planned change. Accountability concepts and principles can be applied to organizational maintenance and support, production, regulation and renewal processes in terms of the strategic plans of the organization and the effectiveness of its input-output transactions. In essence, the term "accountability" connotes the following concepts: (1) "subject to an authority," (2) "subject to penalty in case of default," (3) "responsible for actions which one may be called to account," (4) "subject to control and review by a designated authority under certain conditions," and (5) "legally bound or morally obligated to fulfill the requirements of a specific goal-oriented mission."

Accountability is established by means of explicitly stated philosophies, purposes, priorities, policies and procedures. It is a reciprocal organizational relationship which is established between organizations and levels of organization for the effective, efficient and responsible management of performance. It is based as much on democratic ideals, faith in one's fellow men and trust as it is on surveillance and control. The key level of organization in an accountability system is the operational level where task-level achievements result in incremental progress toward desired goals.

Figure 4

MODEL OF RELATIONS AMONG CAUSAL, INTERVENING, AND END-RESULT VARIABLES*



* ADAPTED FROM RENSIS LIKERT AND DAVID G. BOWERS "ORGANIZATIONAL THEORY AND HUMAN RESOURCE ACCOUNTING," AMERICAN PSYCHOLOGIST, VOL. 24, NO. 6 (JUNE, 1969), PP. 585-592.

A system of accountability for a multi-level, multi-organizational educational system must be designed in terms of significant legislative, executive, managerial and operational relations and actions. The system must be flexible enough to accommodate a variety of individual, organizational and managerial behaviors. In addition, it must be adaptive in terms of wide diversities in capability, involvement, interaction-influence and change contexts. It must be designed to be responsive to changing societal values, expectations, needs, goals and demands. It must provide for the continuous appraisal of organizational practices and products and for performance as well as financial accounting.

Essential Activities in System Analysis, Synthesis and Evaluation

Before one can develop an adaptive framework and a strategy for planned system change, he must secure a functional knowledge of the essential activities which underlie system analysis, synthesis and evaluation. These activities can be derived from the concepts and relations presented in Figure 1. It is important that the reader realize that if he memorizes the basic model of system-environment relations and secures a functional knowledge of these concepts and relations in terms of system analaysis, synthesis and evaluation; then, he is afforded a simple mental template that can be used over and over again in the development of adaptive frameworks and planned system change strategies.

The following essential activities have been derived subject to the numbers and concepts presented in a model of basic system-environment relations (Figure 5).

1. Define the nature and the boundaries of the universe of concern

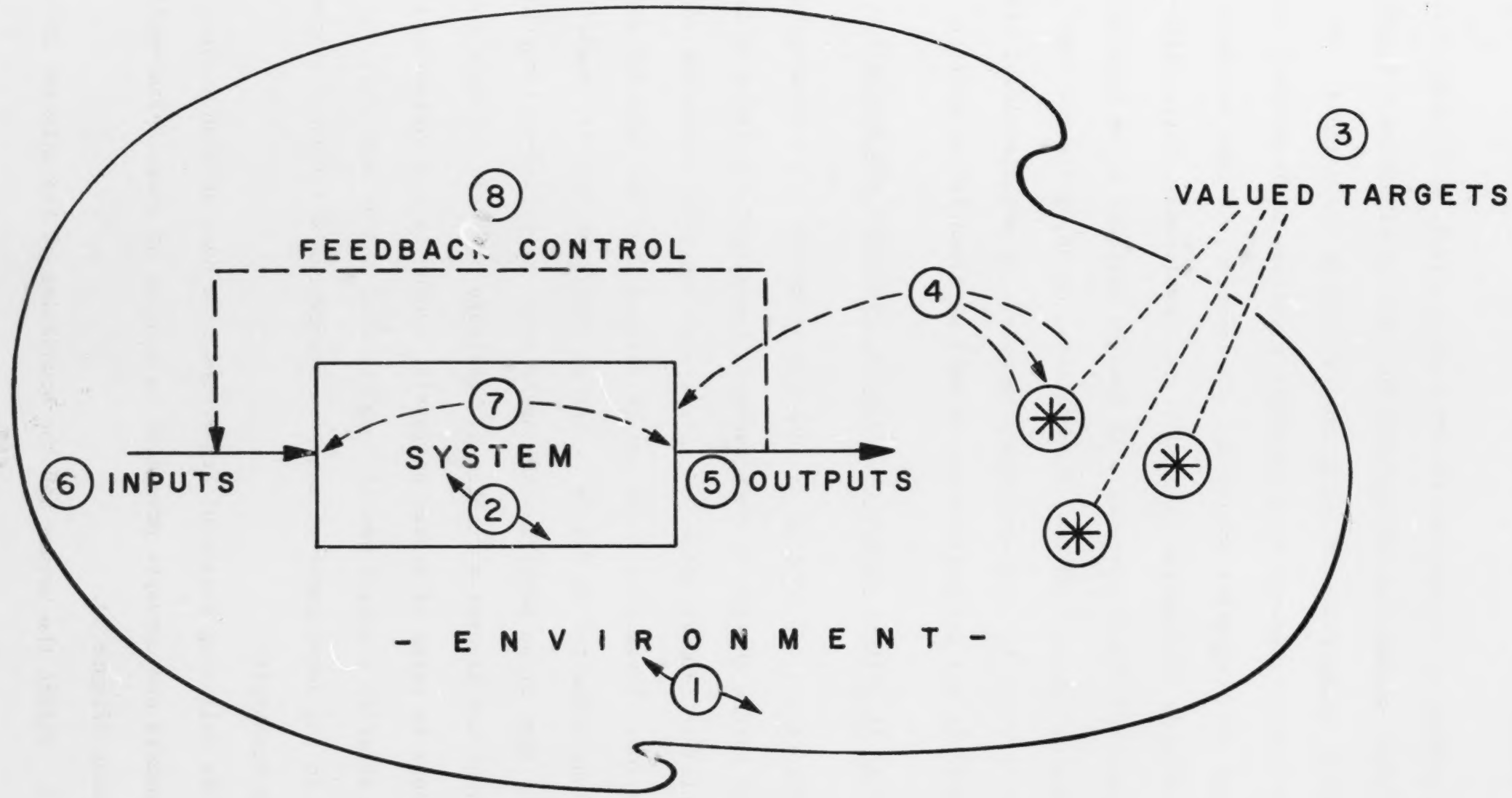


Figure 5. Essential Activities in System Analysis, Synthesis and Evaluation

or environment which surrounds the system, interacts with it and influences its behavior. The boundaries of the environment are defined to include all significant external variables that affect the system, its inputs and/or its outputs.

2. Define the nature and the boundaries of the primary area of concern or system that is the object of interest in planned change. The system's external boundaries represent interfaces between the system and its environment. Input and output exchanges between the system and its environment take place across the system's boundaries.

3. Define the valued targets that are relevant to both the system and its environment. These targets establish the significance of system-environment relations and orient the system to environmental factors which promise to generate influential forces for change. Such factors include system-environment impact problems, societal needs and desired future societal states of expectation or goals.

4. Derive, specify and negotiate the purposes of the system relative to valued targets. Goals and objectives are derived from future-oriented environmental and societal factors and specified, in so far as possible, in verifiable performance terms. All purposes must be negotiated to assure compatibility among societal, organizational and individual purposes and to attain individual commitments toward their accomplishment.

5. Determine the nature and quality of essential system outputs required to achieve system objectives and, hence, to attain system goals. Output specifications and criteria are defined as quality control elements to assure that system performance will be output-oriented and consistent with prespecified purposes.

6. Appraise the nature and quality of system inputs necessary for the production of required system outputs. Realizing that system inputs may be limited, one must appraise also the nature and quality of available system inputs. The discrepancy between required and available system inputs may necessitate the redefinition of system output expectations and related purposes. This constitutes an essential aspect of system optimization.

7. Search for and/or develop and select alternative courses and/or methods-means for action and change that can be used to efficiently transform available inputs into required system outputs. Efficiency is determined by measuring the degree to which a positive or goal-oriented difference is effected between input costs and values and output costs and values. Thus, the efficiency produced through use of a given alternative is measured in terms of that alternative's contribution to goal attainment. The measurement of consequences (costs and values) experienced by a system through time is an essential

aspect of efficiency determination.

8. Establish feedback control processes which will serve to regulate system performance and, thereby, will tend to assure the nature and quality of system outputs, achievement of pre-specified purposes, continuity and effectiveness. The effectiveness of a system is determined by measuring the degree to which system outputs fulfill societal change requirements and satisfy organizational and individual needs and desires. Outputs that are responsive to human needs and desires enable the system to establish and maintain advantageously balanced input and output relations and transactions with its environment. Each new set of outputs provokes a fresh supply of inputs from the environment. Thus, effectiveness contributes to the system's continuity.

The Short-Range and Long-Range Aspects of Planned System Change

The short-range aspects of planned system change (Figure 6) reveal that each of the foregoing basic considerations and essential activities in system analysis, synthesis and evaluation can be viewed temporally in terms of a system's initial, enroute and evaluative state variables and contexts. Since change is an inevitable condition of being, the system's enroute and evaluative states will differ from its initial state. Many discrepancies can be defined between initial and desired or expected future states of being. In relation to the model, it must be emphasized that planned system change: (1) takes place in a definite time frame or sequence of events; (2) involves consideration of goal-oriented change state variables and contexts; (3) encompasses an integrated network of activities which can be organized relative to definable events; and (4) requires periodic evaluation of progress, performance and outputs for greatest efficiency and effectiveness.

Additional insight can be gained relative to planned system change by investigating its long-range aspects (Figure 7). The number of

Figure 6

SHORT-RANGE ASPECTS OF PLANNED SYSTEM CHANGE

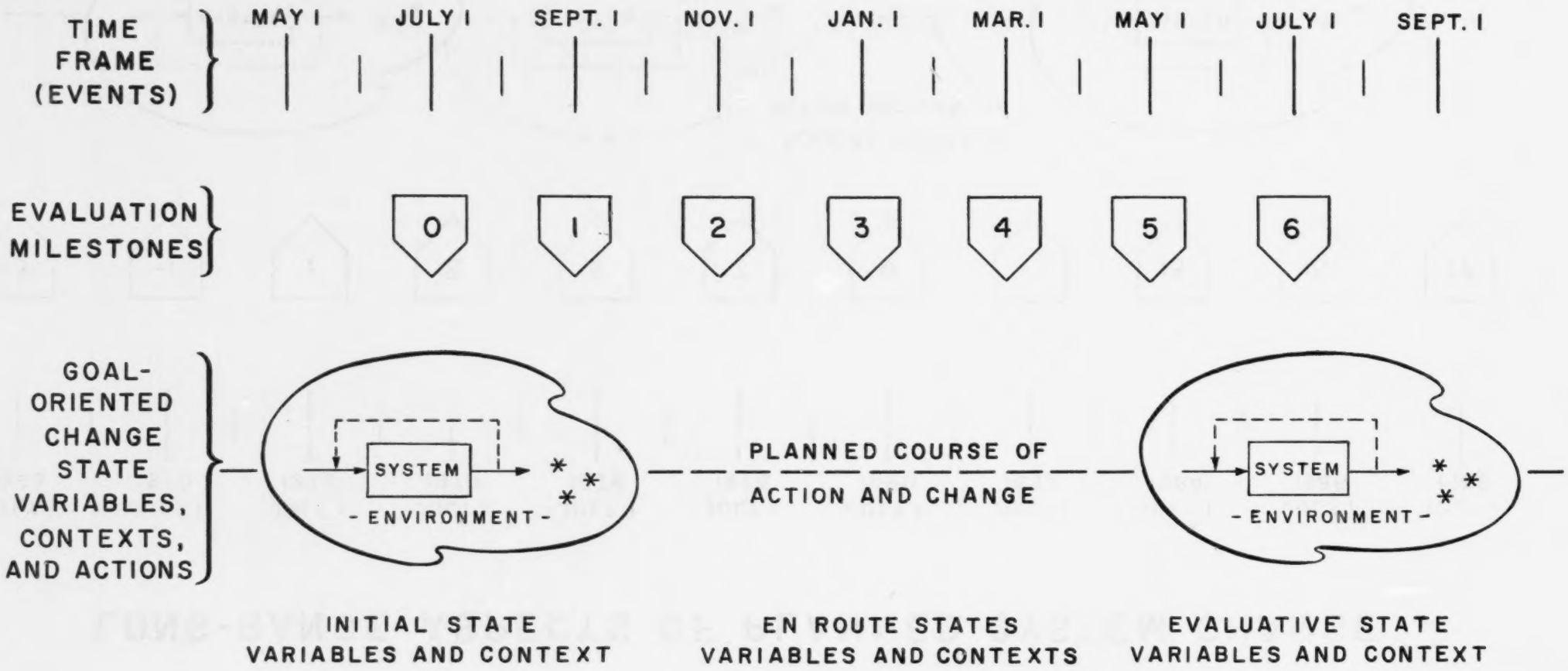
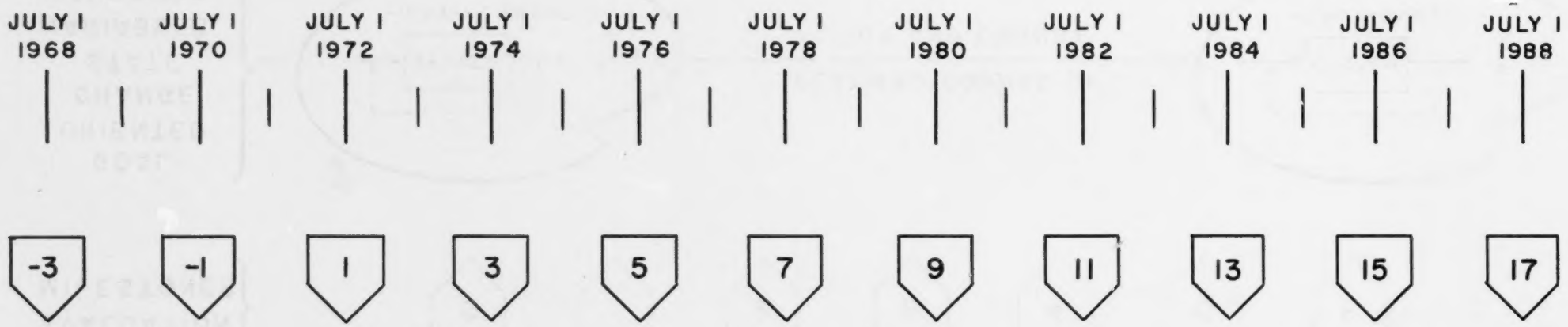


Figure 7

LONG-RANGE ASPECTS OF PLANNED SYSTEM CHANGE



potential problems, crises and conflicts multiply as functions of the probably future societal and environmental changes that can be expected to occur. Consider planned instructional system change requirements relative to the vertical and longitudinal aspects of curriculum development. During any single year in a K-12 public school district, integrated and articulated instructional programs for grades K-12 must be operated. Longitudinally, each individual learner should reap the qualitative and quantitative benefits of planned instructional system change as he experiences the respective levels of a K-12 public education. Certainly, he should not experience a tenth grade program that is identical to the tenth grade program that was operated five years earlier.

The use of fiscal year budget planning reference periods which extend over seven years will tend to regulate planned instructional system change. Since a multi-year program and financial plan must be developed, planned system change must be consistent with the retrospective and prospective aspects of the reality of the system's existence. This requirement serves to emphasize that planned system change must be regulated in an effort to assure that the system's inputs will be conserved and managed toward the attainment of its purposes.

The essential requirement for planned system change is information that can be used to make choices and determine the probable consequences of particular choices. For effective decision-making the information must be complete, accurate, relevant and timely. The basic considerations and essential activities in system analysis, synthesis and evaluation encompass the parametric aspects of planned system change. The information produced during system analysis, synthesis and evaluation must be carefully integrated in terms of both the descriptive and predictive aspects

of system behavior. An adaptive framework is developed to account for the natural and behavioral aspects of a system which are relevant to planned system change.

CHAPTER II

ADAPTIVE FRAMEWORK BASIC DESIGN CONSIDERATIONS

Introduction

Adaptive frameworks, containing relevant organizational parameters and change variables, are used to conceptualize and simulate the development, installation and operation of innovative change programs in terms of present organizational plans, practices, performance and outputs and desired future societal and organizational goals. They are usually developed in matrix form providing multiple-dimensional insights relative to planned system change variables, contexts and actions. From these insights alternative change perspectives are developed. The accuracy and flexibility of adaptive frameworks are the result of the design abilities of those generating them. To be of use, they must be flexible and adjustable to accommodate the analysis, synthesis and evaluation of diverse change alternatives and their probable consequences.

The increasing complexity of societal-environment problems has served to enhance the need for and use of adaptive frameworks in public policy decision making and in the management of planned change in public affairs. The nature of a public enterprise, such as education, presents a challenge to the designers of adaptive frameworks. Education enterprises usually take a bureaucratic form of loosely federated, multi-level, multi-organizational systems organized to attain specific societal goals and/or

to perform definite societal functions. Although component organizations share common goals, they possess considerable autonomy and exhibit both collective and individual styles of behavior. As components in a larger system, each organization cooperates in the attainment of system purposes. Yet, as somewhat autonomous entities, each organization possesses a highly individualistic set of additional purposes and exhibits unique functional interactions and interrelations. Each organization has a unique structure, climate and management behavior. The differences among organizations in a system necessitate a flexible adaptive framework capable of accommodating the types and ranges of diversity present in each organization and in the system as a whole.

Basic Design Considerations

The federated form of state education systems and the informational requirements of legislative, executive, managerial and operational bodies involved in making or implementing public policy decisions in education emphasize specific design considerations for adaptive frameworks. An adaptive framework for public education and educational management should:

1. Provide a comprehensive analytical structure encompassing the major dimensions of public concern and the relevant issues that are clearly within the jurisdictional boundaries, scopes of authority and areas of assigned responsibility of educational organizations.

2. Facilitate planned change within programs and organizations as well as in multi-level, multi-organizational systems of public education.

3. Be flexible and comprehensive in terms of human organization change variables relative to organizational structures, climates and managerial behaviors that are conducive to planned change.

4. Provide a comprehensive planning referent for the development of alternative education program structures which are designed to

effect planned changes in organizational and individual behavior.

5. Provide a comprehensive strategic planning structure that can be used as a tool to appraise educational philosophies, set educational goals, establish priorities among goals and determine educational and organizational policies.

6. Provide a realistic structure that can be used to appraise the probable time, cost, value and technical requirements in planned educational achievement.

7. Be structurally compatible with the policy-making, managerial and operational performance requirements of local educational agencies.

8. Be operationally usable as a communication referent throughout the educational system in which it is to be implemented.

9. Facilitate the evaluation of change efficiency and effectiveness and the cumulation and dissemination of information at and between the successive levels of organization in the education system.

10. Facilitate communication and the handling of complete, accurate, relevant and timely information for decision making at and between all levels of organization in the educational system.

11. Be useful in the establishment of an accountability structure which encompasses the multi-level, multi-organizational dimensions of the educational system.

12. Provide a structure that can be used to determine the validity and relevancy of educational purposes, programs, policies and functions.

13. Maintain high degrees of relevance with the change characteristics of individual learners, the operational context of instruction and learning, the probable future states of society and the educational alternatives which can be used to facilitate changes in individual behavior.

14. Be flexible in terms of changing political, legal, social, technical and economic trends and forces which influence public policy decision making in education.

15. Be structured using categories and elements which are as mutually exclusive as possible.

16. Provide a structure for the assessment, valuation and designation of priority problems and/or issues which can be associated with organizational parameters and educational change variables incorporated in the framework.

17. Establish an analytical structure for appraising issues, finding

problems, searching for alternatives, determining the probable consequences of alternatives, specifying objectives, designing courses of action, defining output and performance specifications and criteria, developing plans and strategies for action and designing management procedures.

18. Provide a comprehensive structure that can be used as a tool in the conceptualization, simulation and evaluation of educational change alternatives.

19. Be operable and manageable at all levels of organization in the educational system without requiring the use of technical consultants.

20. Establish a realistic structure that can be used to appraise the probable impact of policy and program mix alternatives on the efficiency and effectiveness of educational organizations and the system as a whole.

Design Logic

The foregoing design considerations provide relevant insights for testing the adequacy of an adaptive framework. However, they are not particularly instructive regarding the actual construction of an adaptive framework. What is needed in construction is a logical principle which will enable the designer to systematize the relevant organizational parameters and change variables which are to be incorporated in the framework. In its final form, an adaptive framework should provide multiple perspectives relative to the planning and management of change. Multiple perspectives can be provided if the individual aspects of a multi-dimensional adaptive framework can be utilized to provide a relevant perspective for planned change.

An Adaptive Framework for Public Education and Educational Management was designed using the following logical principle:

> . . . the whole science, including mathematics, consists of the study of transformations or in the study of relations. . . . given a transformation, you have a function and a relation;

> given a function, you have a relation and a transformation;
> given a relation, you have a transformation and a function;
> one thing--three aspects; and the fact is exceedingly interesting
> and weighty.[6]

A model of the foregoing statement by Keyser is presented in Figure 8. The model can be used to appraise the interdependencies which exist among the concepts. The concepts "function," "transformation" and "relation" share common elements. For example, the idea of "function" is incorporated as an element in the concepts "transformation" and "relation." Thus, as the model is used to appraise such interdependencies, a pattern of conceptual interrelationships can be defined.

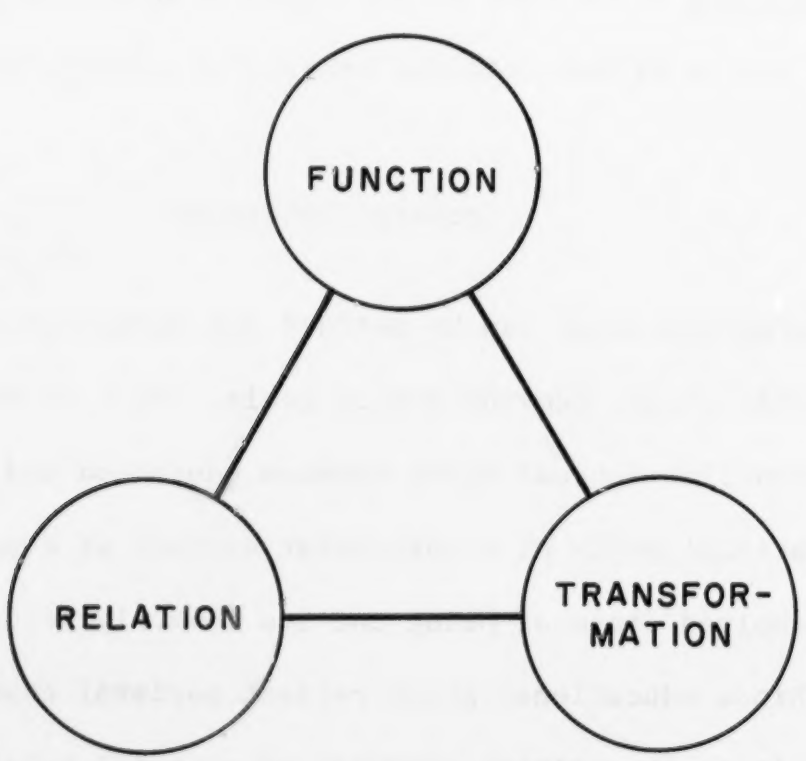


Figure 8. A Model of Interdependencies Among the Concepts "Function," "Relation" and "Transformation"

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[6]Cassius J. Keyser, Mathematical Philosophy, as reported in Alfred Korzybski Science and Sanity (Lakeville, Connecticut: The International Non-Aristotelian Library Publishing Company, 1958), p. 131.

This pattern of conceptual interrelationships or interdependencies which exists between functions, transformations and relations provides a logical premise for the construction of an adaptive framework. The notion of "one thing--three aspects" suggests a three-dimensional matrix form for the framework. Each face of the matrix could be used to gain separate but related perspectives of public education and educational management. In the context of public education, the logical correlates of relations, transformations and functions are: (1) significant <u>societal relations</u> that must be maintained by educational organization; (2) the <u>behavioral</u> transformations to be effected in individual learners; and (3) the <u>operational functions</u> which must be performed to attain effective societal relations and to effect required behavioral transformations.

Societal Relations

Societal relations can be defined and categorized in terms of values, expectations, needs, demands and/or goals. Each of these categories can be used to establish logical bonds between education and society. The specified educational goals of a particular society at a point in time reflect both its evolved state of being and its commonly accepted pattern of values. Since educational goals reflect societal changes through time, they constitute the primary category of societal relations. Another reason for the primacy of educational goals resides in the fact that they tend to remain fairly stable over sufficiently long periods of time. This is especially important in comprehensive planning and the development of educational programs of planned change. For these reasons, it was decided that educational goals would be used as one dimension on the adaptive

framework. The Goals for Public Education in Texas were selected for incorporation in the framework after an appraisal of existing state goals for public education.

Behavioral Transformations

Behavioral transformations are the acts, processes or instances of changing the manner or condition of an individual's self-conduct. The particular changes to be effected in one's self-conduct are specified relative to those behavioral characteristics which are desired and valued by society. Defined output behavioral characteristics constitute a primary source of criterion references that can be used to evaluate processes of planned behavioral change. Specific course(s) and/or method(s) of change are designed to modify specific input behavioral characteristics toward desired output behavioral characteristics. Both the input and the output behavioral characteristics of the individual are defined in terms of his personality, growth and development, and environment. The process of planned change is designed to accommodate the individual's purposes, potentialities, life needs and unique capabilities. After careful consideration, the second dimension of the framework was designed to incorporate the relevant change characteristics of individual learners. The matrix was designed to accommodate both input characteristics as well as output characteristics in an effort to establish a goal-oriented and time-bound context for planned change.

Operational Functions

Operational functions are goal-directed educational activities which

are the assigned societal responsibilities of particular educational organizations. The specific roles assigned to individual organizations depend upon the philosophies, purposes, priorities, policies and programs advocated and/or adopted by an educational system. In addition, the role assignment of an organization will be influenced by its location in the multi-level, multi-organizational hierarchy of the system. The productivity of each educational organization in the system contributes to the achievement of desired and valued societal benefits. Each activity performed by an individual organization should be made directly relevant to specific societal goals for public education, the probable future societal states to be experienced and defined societal change requirements. The functional aspects of goal-directed performance on the part of individual organizations is reflected by the programs which they operate. For this reason, organizational programs were selected for incorporation in the matrix as its third dimension.

Basic Dimensions

The three dimensions selected for incorporation in the adaptive framework are: (1) the educational goals to be attained; (2) the change characteristics of individual learners; and (3) the organizational programs which are operated by educational organizations to effect changes in individual learner behavior and, thereby, to achieve effectiveness in the attainment of societal goals for public education. The three-dimensional matrix formed by use of selected dimensions possesses six educational goal elements, six change characteristic elements and seven organizational program elements. Thus, the block form of the matrix consists of 252 separate but related units. Each of these units can be characterized by three particular design elements; namely, an educational goal, a set of change characteristics and an organizational program.

The basic dimensions of an adaptive framework for public education and educational management are presented in Figure 9. The basic dimensions of the adaptive framework include:

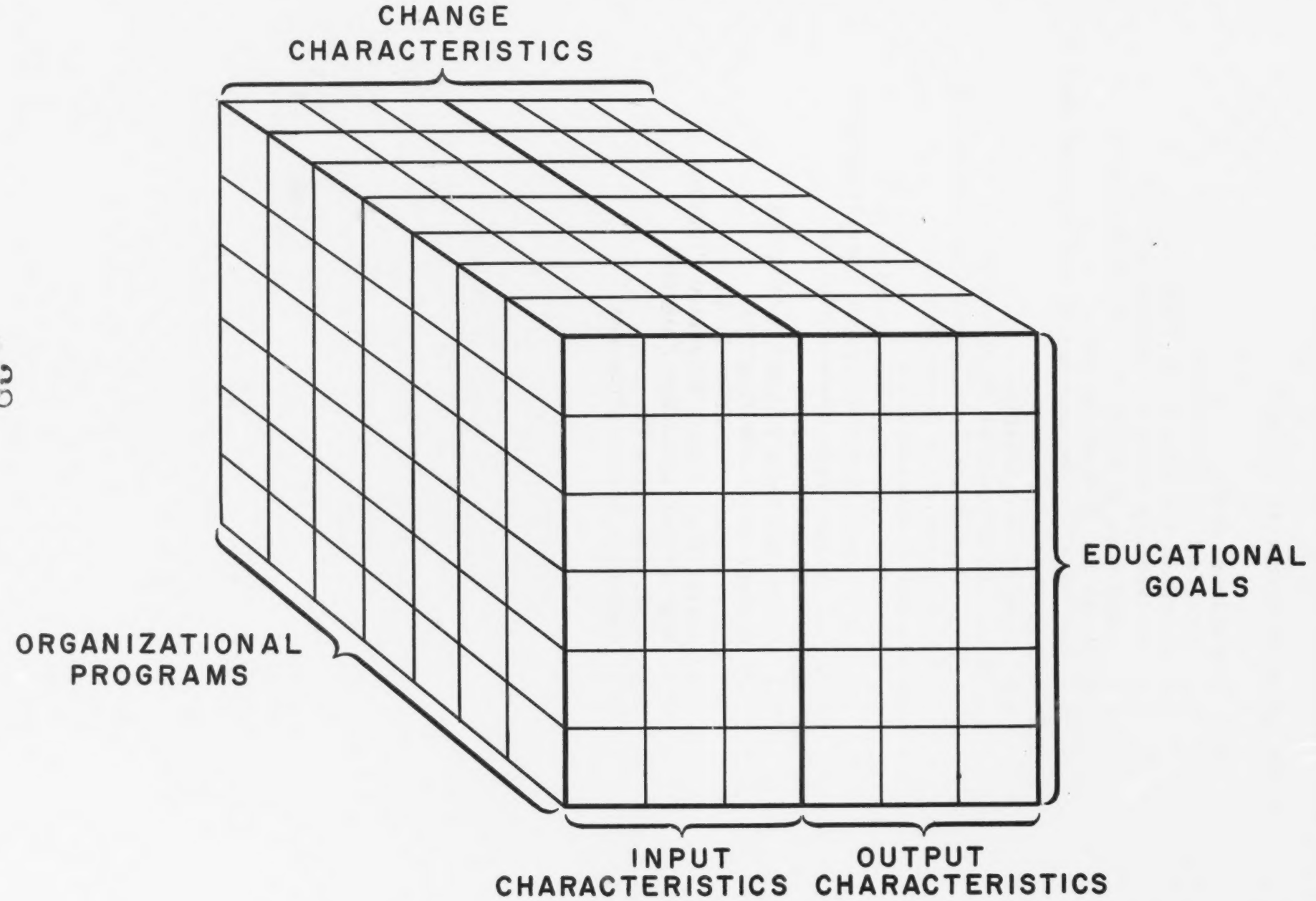
1.0 Educational Goals
- 1.1 Intellectual Discipline
- 1.2 Economic and Vocational Competence
- 1.3 Citizenship and Civic Responsibility
- 1.4 Competence in Human and Social Relations
- 1.5 Moral and Ethical Values
- 1.6 Self-Realization and Mental and Physical Health

2.0 Change Characteristics
- 2.1 Input Characteristics
  - 2.1.1 Environmental Characteristics
  - 2.1.2 Growth and Development Characteristics
  - 2.1.3 Personality Characteristics
- 2.2 Output Characteristics
  - 2.2.1 Environmental Characteristics
  - 2.2.2 Growth and Development Characteristics
  - 2.2.3 Personality Characteristics

3.0 Organizational Programs
- 3.1 Early Childhood Education Programs
- 3.2 Primary Education Programs
- 3.3 Intermediate Education Programs
- 3.4 Junior High School Education Programs
- 3.5 High School Education Programs
- 3.6 Adult Education Programs
- 3.7 Community Service Programs

Figure 9

BASIC DIMENSIONS OF AN ADAPTIVE FRAMEWORK FOR PUBLIC EDUCATION



CHAPTER III

BASIC DIMENSIONS OF THE ADAPTIVE FRAMEWORK

The adaptive framework provides a comprehensive analysis-synthesis-evaluation structure that can be used to define significant interrelations and interdependencies between educational goals, change characteristics and organizational programs. Each dimension and its sub-dimensions can be subset into a hierarchy of subordinate elements. A branching network can be used to display the relations which exist between subordinate elements and the basic dimensions of the adaptive framework.

Educational Goals

As one dimension of the framework, educational goals consist of six sub-dimensions as revealed in the simple branching network depicted in Figure 9. A two-level branching network of educational goals is presented in Figure 10. The subsetting activity is continued until the end items are perceived to be operationally relevant. Each individual subset of a basic dimension (i.e., intellectual discipline) and each branching level (i.e., 1.1 through 1.6) is tested for equivalence with its precursor element or level.

The branching network for educational goals was carried to the third level of detail. Thus, the educational goals dimension of the adaptive framework containing six primary goal sub-dimensions was expanded to 152

(1.0.) EDUCATIONAL GOALS
(1.1.) INTELLECTUAL DISCIPLINE
(1.2.) ECONOMIC & VOCATIONAL COMPETENCE
(1.3.) CITIZENSHIP & CIVIC RESPONSIBILITY
(1.4.) COMPETENCE IN HUMAN & SOCIAL RELATIONS
(1.5.) MORAL & ETHICAL VALUES
(1.6.) SELF-REALIZATION & MENTAL & PHYSICAL HEALTH

Figure 10. A Simple Branching Network of Educational Goals.

subordinate elements at the third level. Certainly more data and information can be made relevant to the many parts than can be made relevant to the educational goals dimension considered as a whole. The branching network facilitates the cumulation of data and information upward through the branching hierarchy of goals and provides a framework for data and information handling relative to educational goals. Thus, the six primary goal sub-dimensions depicted in Figure 10 can be used to cumulate available data and information regarding 152 subordinate goal elements that are relevant to public education and educational management.

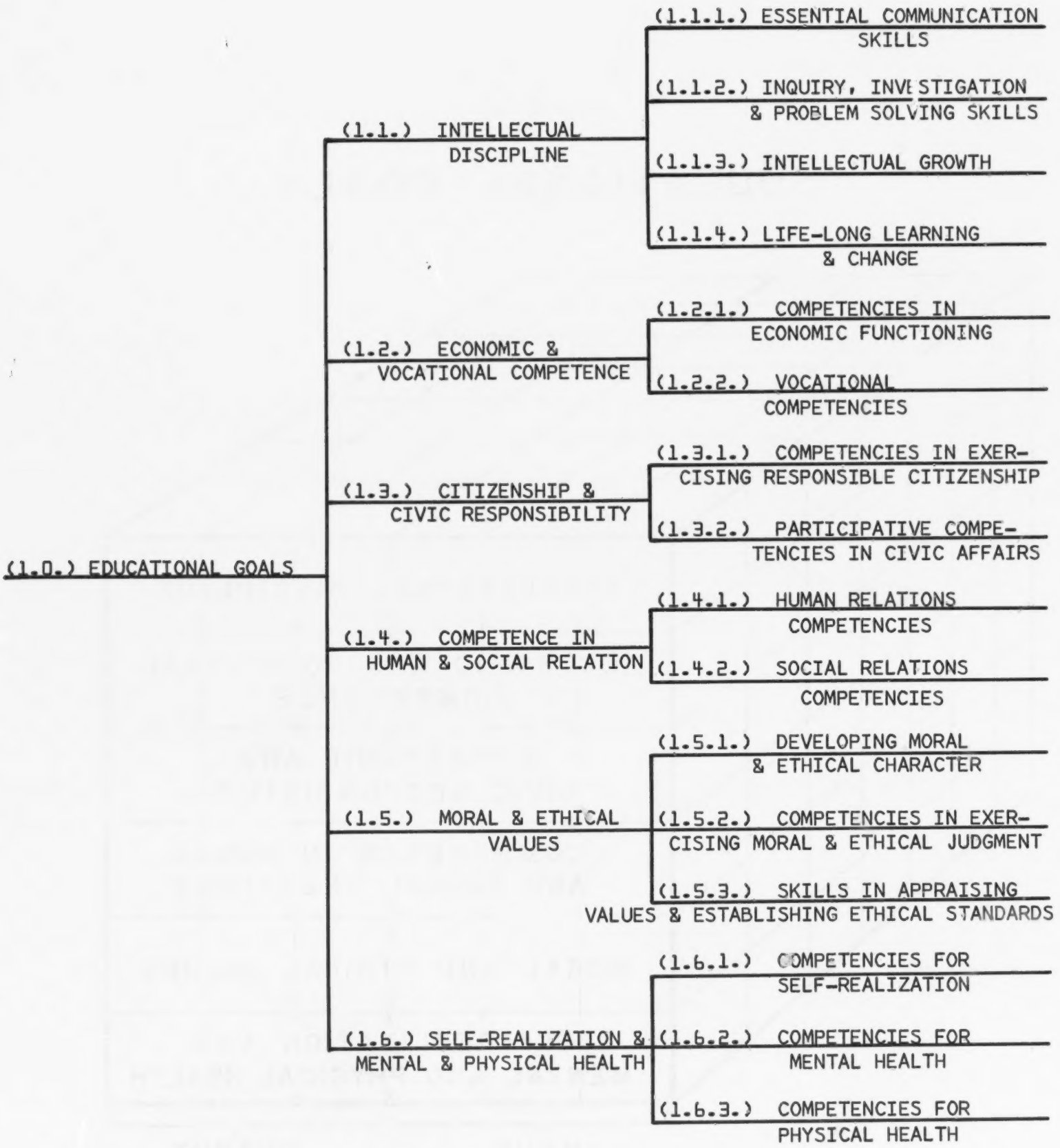
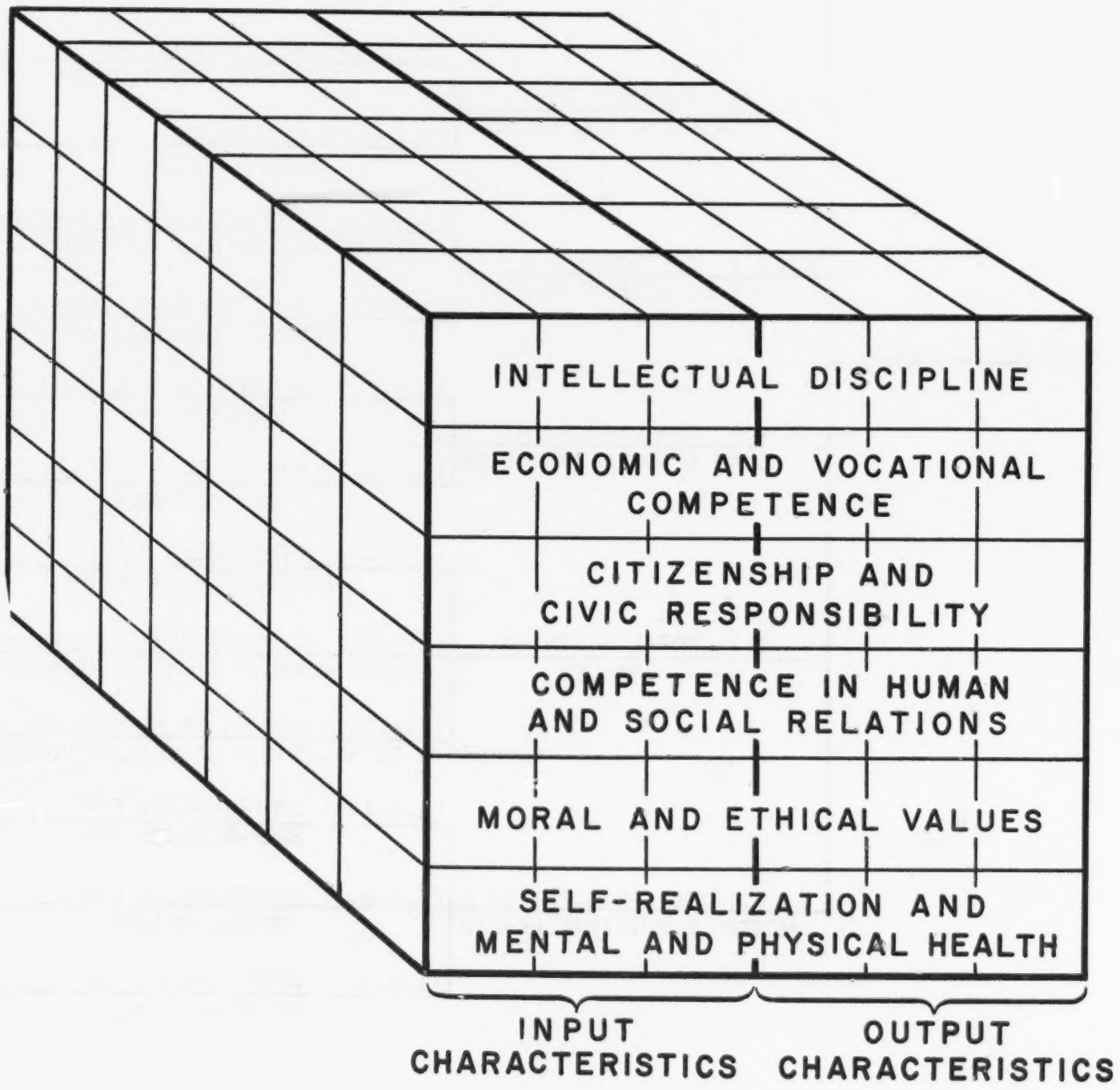

(1.0.) EDUCATIONAL GOALS
(1.1.) INTELLECTUAL DISCIPLINE
(1.1.1.) ESSENTIAL COMMUNICATION SKILLS
(1.1.2.) INQUIRY, INVESTIGATION & PROBLEM SOLVING SKILLS
(1.1.3.) INTELLECTUAL GROWTH
(1.1.4.) LIFE-LONG LEARNING & CHANGE
(1.2.) ECONOMIC & VOCATIONAL COMPETENCE
(1.2.1.) COMPETENCIES IN ECONOMIC FUNCTIONING
(1.2.2.) VOCATIONAL COMPETENCIES
(1.3.) CITIZENSHIP & CIVIC RESPONSIBILITY
(1.3.1.) COMPETENCIES IN EXERCISING RESPONSIBLE CITIZENSHIP
(1.3.2.) PARTICIPATIVE COMPETENCIES IN CIVIC AFFAIRS
(1.4.) COMPETENCE IN HUMAN & SOCIAL RELATION
(1.4.1.) HUMAN RELATIONS COMPETENCIES
(1.4.2.) SOCIAL RELATIONS COMPETENCIES
(1.5.) MORAL & ETHICAL VALUES
(1.5.1.) DEVELOPING MORAL & ETHICAL CHARACTER
(1.5.2.) COMPETENCIES IN EXERCISING MORAL & ETHICAL JUDGMENT
(1.5.3.) SKILLS IN APPRAISING VALUES & ESTABLISHING ETHICAL STANDARDS
(1.6.) SELF-REALIZATION & MENTAL & PHYSICAL HEALTH
(1.6.1.) COMPETENCIES FOR SELF-REALIZATION
(1.6.2.) COMPETENCIES FOR MENTAL HEALTH
(1.6.3.) COMPETENCIES FOR PHYSICAL HEALTH

Figure 11. A Two-Level Branching Network of Educational Goals

Figure 12

EDUCATIONAL GOALS



1.0 EDUCATIONAL GOALS

1.1 Intellectual Discipline
- 1.1.1 Essential Communication Skills
  - 1.1.1.1 speaking the mother tongue
  - 1.1.1.2 reading the mother tongue
  - 1.1.1.3 writing the mother tongue
  - 1.1.1.4 spelling the mother tongue
  - 1.1.1.5 listing numbers and using number relations
  - 1.1.1.6 listening and discriminating sounds, vibrations, shock waves, etc.
  - 1.1.1.7 developing listening and perceiving skills
  - 1.1.1.8 observing and discriminating colors, lines, forms, etc.
  - 1.1.1.9 expressing one's self musically, dramatically and/or artistically
  - 1.1.1.10 developing skills in the use of foreign language
  - 1.1.1.11 developing skills to effectively communicate ideas and feelings
- 1.1.2 Inquiry, Investigation and Problem-Solving Skills
  - 1.1.2.1 maintaining an attitude of open-mindedness
  - 1.1.2.2 thinking, reasoning and solving problems independently
  - 1.1.2.3 solving one's problems of counting and calculating
  - 1.1.2.4 developing inquiry, investigation and problem-solving methods, techniques and procedures
  - 1.1.2.5 adopting effective strategies for analysis, evaluation and interpretation of information
  - 1.1.2.6 discriminating similarities and differences
  - 1.1.2.7 controlling, manipulating and measuring objects
  - 1.1.2.8 organizing knowledge and information
  - 1.1.2.9 classifying objects and events
  - 1.1.2.10 developing strategies for verifying and validating information
  - 1.1.2.11 synthesizing operational definitions and models
  - 1.1.2.12 thinking in concrete, empirical and formal logic terms
  - 1.1.2.13 inferring, predicting and experimenting
  - 1.1.2.14 formulating hypotheses and assessing alternative choice-consequence relations
- 1.1.3 Intellectual Growth
  - 1.1.3.1 developing skills in self-direction, self-evaluation and self-regulation
  - 1.1.3.2 availing one's self of the accumulated culture and wisdom of man
  - 1.1.3.3 thinking in abstract terms
  - 1.1.3.4 manipulating language and abstract symbols
  - 1.1.3.5 developing and maintaining one's native curiosity

1.1.3.6 developing and maintaining one's native creativity
1.1.3.7 comprehending and appreciating human achievements
1.1.4 Life-long Learning and Change
1.1.4.1 tolerating ambiguity and uncertainty
1.1.4.2 adjusting to unexpected change
1.1.4.3 engaging in self-directed and self-instructed learning activities
1.1.4.4 continuing development of communication skills
1.1.4.5 developing an appetite for learning and self-development
1.1.4.6 anticipating and adapting one's self to environmental and societal changes
1.1.4.7 developing mental and physical competencies for use of leisure time
1.1.4.8 developing an understanding of the past, identifying one's self with the present and developing competencies required in the future
1.2 Economic and Occupational Competence
1.2.1 Competencies in Economic Functioning
1.2.1.1 managing one's economic resources
1.2.1.2 developing a functional knowledge of the American economic system
1.2.1.3 developing competencies needed for functioning in the American economic system
1.2.1.4 realizing the economic value of one's labor and productivity
1.2.1.5 developing consumer skills
1.2.1.6 planning the economic productivity of one's own life
1.2.1.7 developing an understanding of economic responsibility
1.2.1.8 maintaining a balance between one's economic input and output potentials
1.2.1.9 developing a balance between an economic rationality and other forms of societal decision-making rationalities
1.2.2 Competencies in Career Selection and Occupational Skills
1.2.2.1 selecting one's life career(s) and/or occupation(s)
1.2.2.2 appreciating social value of one's labor and productivity
1.2.2.3 assessing employment requirements for various occupations
1.2.2.4 comprehending alternative occupational and employment opportunities
1.2.2.5 finding and securing gainful employment
1.2.2.6 demonstrating usable and/or saleable occupational skills and specialized societal competencies
1.2.2.7 developing entry-level job-skill competencies
1.2.2.8 comprehending and developing competence in completing forms
1.2.2.9 competing with others for employment
1.2.2.10 working successfully at gainful and reasonably remunerative employment
1.2.2.11 learning continuous renewal techniques which safeguard one's occupational and career interests
1.2.2.12 maintaining and improving personal and work-related occupational skills
1.2.2.13 participating in occupational and career organizations
1.2.2.14 developing general skills which facilitate career mobility
1.3 Citizenship and Civic Responsibility
1.3.1 Competencies in Exercising Responsible Citizenship

1.3.1.1 comprehending the pluralistic nature of values in American society
1.3.1.2 acquiring the habits and attitudes associated with responsible citizenship in a democracy
1.3.1.3 developing cognizance of the relationships between the United States and other nations in the world
1.3.1.4 appreciating American heritage
1.3.1.5 assessing the instrumental value of democratic processes and actions

1.3.2 Participative Competencies in Civic Affairs
1.3.2.1 participating in community and political life
1.3.2.2 defending the rights of self and others
1.3.2.3 demonstrating pride in one's family and community
1.3.2.4 assessing the value of and tolerating the expression of conflicting ideas and beliefs
1.3.2.5 comprehending the reasons for and use of laws
1.3.2.6 demonstrating law-abiding behaviors
1.3.2.7 demonstrating a "cooperative" attitude in civic affairs

1.4 Competencies in Human and Social Relations

1.4.1 Human Relations Competencies
1.4.1.1 establishing and maintaining effective human relations
1.4.1.2 recognizing and respecting human relations
1.4.1.3 enjoying self-satisfying, sincere and varied social relations
1.4.1.4 demonstrating skills in interpersonal intercultural relations
1.4.1.5 tolerating others
1.4.1.6 comprehending and valuing others
1.4.1.7 respecting rights of others
1.4.1.8 expressing affect and establishing empathetic relations
1.4.1.9 respecting the cultural heritages of others
1.4.1.10 valuing natural and societal resources

1.4.2 Social Relations Competencies
1.4.2.1 developing capabilities for functioning in group situations
1.4.2.2 observing rules for etiquette
1.4.2.3 demonstrating respect for authority
1.4.2.4 functioning within one's peer group
1.4.2.5 feeling at ease in differing social situations
1.4.2.6 developing an appreciation for and an understanding of other people and other cultures
1.4.2.7 developing an understanding of the political, economic, legal and social patterns of the rest of the world
1.4.2.8 developing an awareness of the interdependence of races, creeds, nations and cultures

1.4.3 Family Life Competencies
1.4.3.1 developing capabilities for effective functioning in the family group
1.4.3.2 demonstrating acceptance of responsibilities as a contributing family member
1.4.3.3 developing an awareness of future family responsibilities and achievement of skills in preparing to accept them

1.5 Moral and Ethical Values

1.5.1 Developing Moral and Ethical Character

1.5.1.1 exercising self-discipline and self-control
1.5.1.2 valuing rights of others
1.5.1.3 respecting truth and honesty
1.5.1.4 possessing and promoting personal and social integrity
1.5.1.5 developing self-regulatory mechanisms regarding socially unacceptable impulses to aggression, sexual expression and extreme dependency
1.5.1.6 demonstrating the courage of one's convictions
1.5.1.7 developing a sense of respect for self and others
1.5.1.8 developing a sense of honor in one's commitments and relations

1.5.2 Competencies in Exercising Moral and Ethical Judgment
1.5.2.1 developing abilities to control and/or change behavioral preferences
1.5.2.2 maintaining responsible direction in one's life
1.5.2.3 demonstrating ability to negotiate and make trade-offs between conflicting values when necessary
1.5.2.4 developing competencies in projecting the effect of one's moral and ethical decisions on others
1.5.2.5 evaluating the moral and ethical values implicity in practical decisions

1.5.3 Skills in Appraising Values and Establishing Ethical Standards
1.5.3.1 deciding what is "right" or "wrong" in terms of one's adopted social values
1.5.3.2 demonstating skill in appraising ramifications of value decisions
1.5.3.3 developing skill in discriminating which values and standards are applicable to the resolution of personal problems
1.5.3.4 appraising responsible direction in one's life
1.5.3.5 developing standards for appraising behavioral preferences against established purposes
1.5.3.6 developing standards for appraising societal and one's personal values and ethical standards
1.5.3.7 seeing the relationships between values and the possible conflict between them
1.5.3.8 appraising societal standards in terms of basic human values

1.6 Self-Realization and Mental and Physical Health
1.6.1 Competencies for Self-Realization
1.6.1.1 managing one's own affairs
1.6.1.2 making personal decisions
1.6.1.3 evaluating one's personal achievements
1.6.1.4 disciplining one's self to reasonably regular, steady and persistent effort towards one's purposes
1.6.1.5 defining one's individual purposes
1.6.1.6 assessing one's personal strengths and weaknesses
1.6.1.7 diagnosing one's life problems and opportunities
1.6.1.8 motivating one's self to change
1.6.1.9 developing a personal capacity for change
1.6.1.10 assessing one's capabilities and resources for change
1.6.1.11 establishing and maintaining an effective personal style and mode in achievement

1.6.1.12 establishing responsible direction in one's own life
1.6.1.13 demonstrating effective expression of ideas and feelings
1.6.1.14 developing inter- and intra-cultural identities and appreciations
1.6.1.15 cultivating an appreciation for beauty in various forms
1.6.1.16 enjoying the aesthetic expression of others
1.6.1.17 assessing opportunities for creative self-expression
1.6.1.18 developing special talents in music, art and literature

1.6.2 Competencies for Mental Health
1.6.2.1 analyzing, evaluating and controlling one's emotions
1.6.2.2 demonstrating ability to function in one's life environment
1.6.2.3 demonstrating ability to distinguish reality from non-reality
1.6.2.4 developing awareness of time and space
1.6.2.5 developing and exercising a capability to learn
1.6.2.6 developing emotional and/or mental stability
1.6.2.7 reacting to frustration with positive action
1.6.2.8 maintaining freedom from debilitating numbers or degrees of fear
1.6.2.9 managing one's self in traumatic experiences
1.6.2.10 developing mechanisms for need satisfaction and role fulfillment
1.6.2.11 developing capacity for delayed gratification

1.6.3 Competencies for Physical Health
1.6.3.1 analyzing, evaluating and interpreting information concerning health and disease
1.6.3.2 protecting one's health and that of others
1.6.3.3 working to improve community health
1.6.3.4 participating in recreational activities
1.6.3.5 appraising and controlling one's physical self
1.6.3.6 developing and maintaining one's physical capacities

Change Characteristics

As a basic dimension of the adaptive framework, change characteristics can be subset into input characteristics and output characteristics as revealed in Figure 13. This initial subset establishes a dicotomy in the change characteristics hierarchy that provides a basis for the evaluation of change. This cleavage enables the adaptive framework to be divided into two equal halves along the heavy line depicted in Figure 9. One half of the framework can be made relative to input characteristics and the other half can be made relative to output characteristics as suggested by the levels in Figure 9. Division of the adaptive framework into two sectors facilitates the appraisal of initial and terminal change characteristics using the separated halves of the framework as referents or guides.

Both the input and the output characteristics are subset into the same classes of subordinate elements; namely, environmental characteristics, growth and development characteristics and personality characteristics. Since both stems of the branching network would be identical, detailed networks will be presented only for input characteristics. Branching networks of environmental characteristics, growth and development characteristics and personality characteristics are presented in Figures 14, 15 and 16, respectively.

The change characteristics dimension of the adaptive framework has been subset to appropriate levels of detail and is presented following Figure 17 to provide an integrated overview. This dimension can be expanded to achieve greater operational relevance when specific target populations and goals for planned change are being considered. In the

overview, this dimension has been expanded into 559 subordinate elements for data and information handling purposes. The data and information available regarding the 559 subordinate elements can be cumulated and made relevant to the six primary sub-dimensions of change characteristics. Figure 17 can be used to appraise the relations between the sub-dimensions of change characteristics and educational goals.

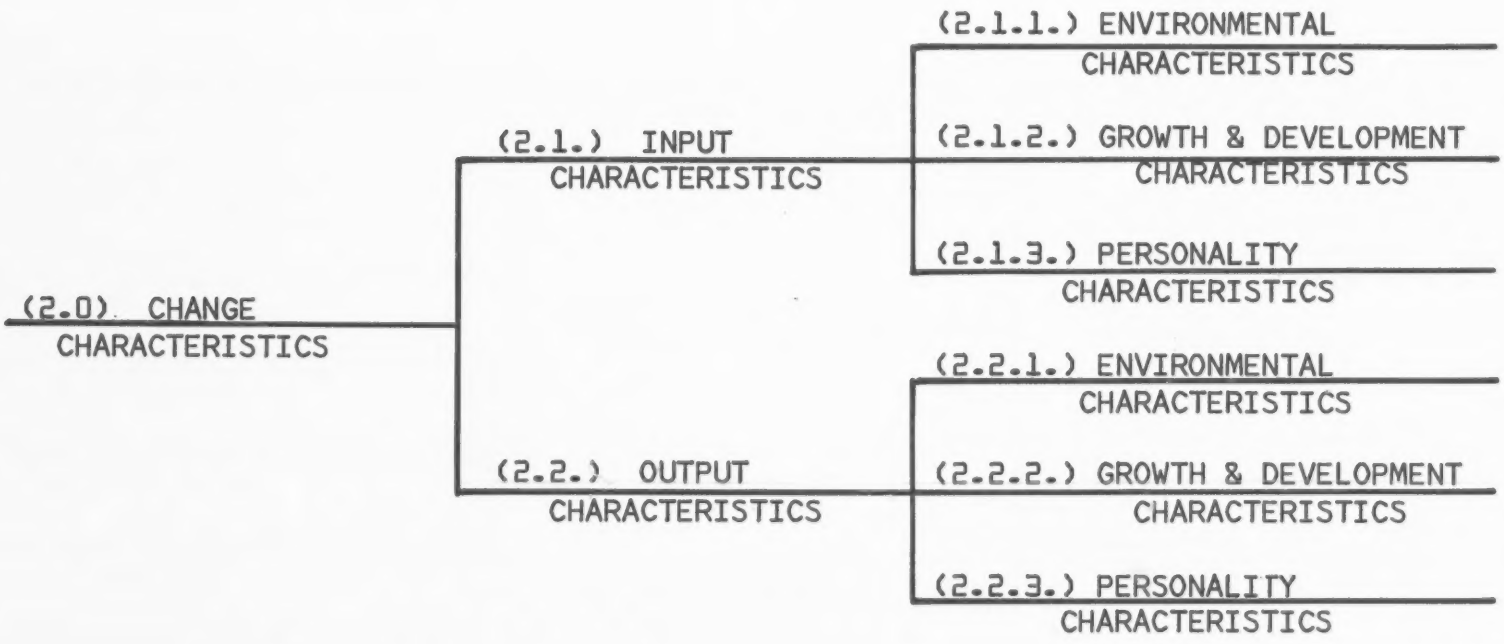


Figure 13. A Two-Level Branching Network of Change Characteristics

(2.1.1.) ENVIRONMENTAL CHARACTERISTICS
(2.1.1.1.) GEOPHYSICAL ASPECTS OF ENVIRONMENT
(2.1.1.1.1.) LOCATION AND TOPOGRAPHY
(2.1.1.1.2.) PHYSICAL CONSTRAINTS ON HUMAN HABITATION
(2.1.1.1.3.) PHYSICAL DIMENSIONS, FORCES AND ENERGY
(2.1.1.1.4.) WEATHER AND CLIMATE
(2.1.1.1.5.) NATURAL RESOURCES
(2.1.1.2.) ECOLOGICAL ASPECTS OF ENVIRONMENT
(2.1.1.2.1.) ECOSYSTEMS, HABITATS AND LIFE SPACE
(2.1.1.2.2.) BIOGEOCHEMICAL CYCLES, PATTERNS AND TRENDS
(2.1.1.2.3.) SUCCESSION, CONTROL AND EVOLUTION
(2.1.1.2.4.) SOCIETY-ENVIRONMENT IMPACT PROBLEMS
(2.1.1.3.) CULTURAL ASPECTS OF ENVIRONMENT
(2.1.1.3.1.) ASPECTS OF MATERIAL CULTURE
(2.1.1.3.2.) NONMATERIAL ASPECTS OF CULTURE
(2.1.1.4.) SOCIETAL ASPECTS OF ENVIRONMENT
(2.1.1.4.1.) DEMOGRAPHIC ASPECTS
(2.1.1.4.2.) FUNCTIONAL MODES AND STATES

Figure 14. A Two-Level Branching Network of Environmental Characteristics

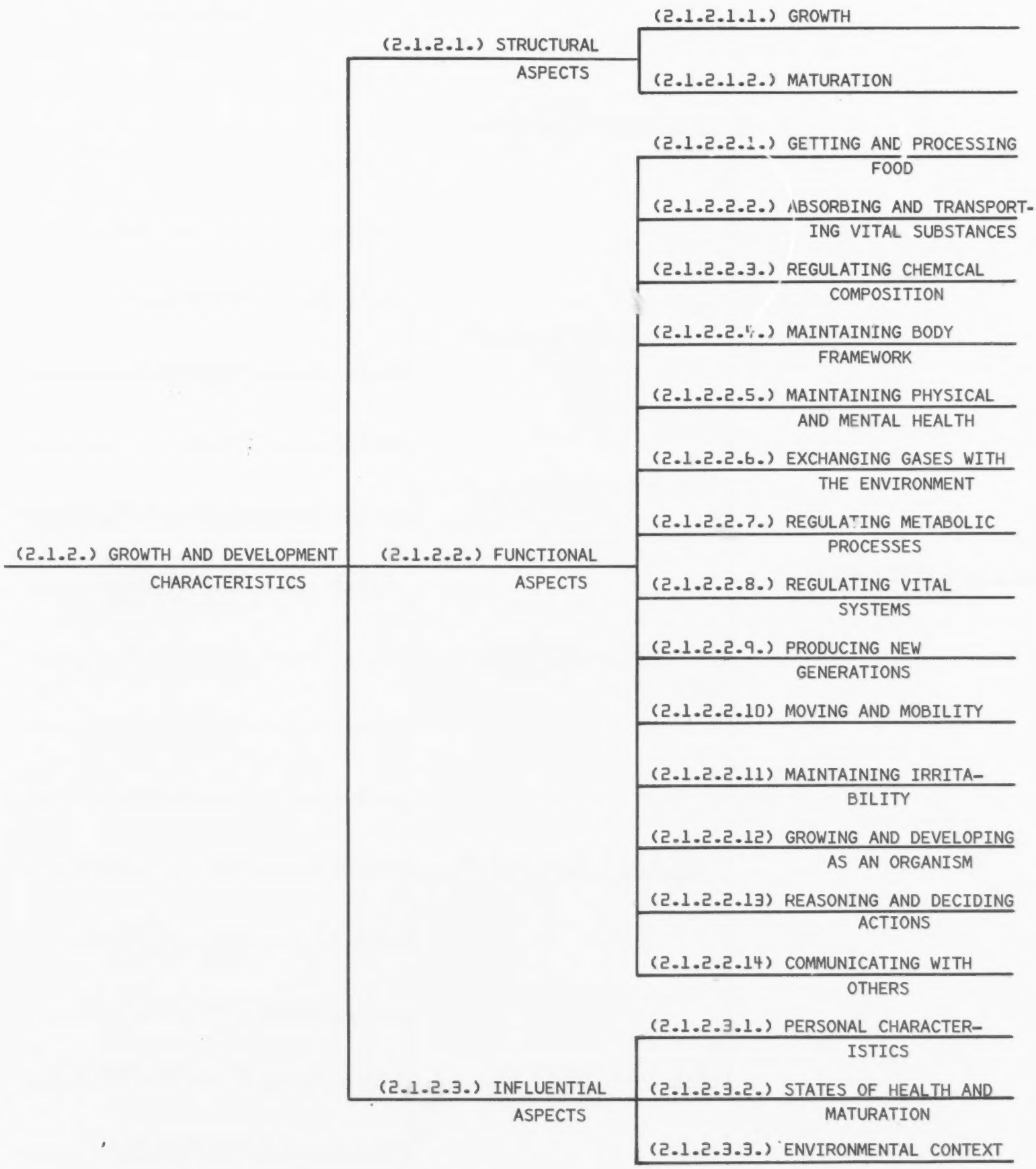

(2.1.2.) GROWTH AND DEVELOPMENT CHARACTERISTICS
(2.1.2.1.) STRUCTURAL ASPECTS
(2.1.2.1.1.) GROWTH
(2.1.2.1.2.) MATURATION
(2.1.2.2.) FUNCTIONAL ASPECTS
(2.1.2.2.1.) GETTING AND PROCESSING FOOD
(2.1.2.2.2.) ABSORBING AND TRANSPORTING VITAL SUBSTANCES
(2.1.2.2.3.) REGULATING CHEMICAL COMPOSITION
(2.1.2.2.4.) MAINTAINING BODY FRAMEWORK
(2.1.2.2.5.) MAINTAINING PHYSICAL AND MENTAL HEALTH
(2.1.2.2.6.) EXCHANGING GASES WITH THE ENVIRONMENT
(2.1.2.2.7.) REGULATING METABOLIC PROCESSES
(2.1.2.2.8.) REGULATING VITAL SYSTEMS
(2.1.2.2.9.) PRODUCING NEW GENERATIONS
(2.1.2.2.10) MOVING AND MOBILITY
(2.1.2.2.11) MAINTAINING IRRITABILITY
(2.1.2.2.12) GROWING AND DEVELOPING AS AN ORGANISM
(2.1.2.2.13) REASONING AND DECIDING ACTIONS
(2.1.2.2.14) COMMUNICATING WITH OTHERS
(2.1.2.3.) INFLUENTIAL ASPECTS
(2.1.2.3.1.) PERSONAL CHARACTERISTICS
(2.1.2.3.2.) STATES OF HEALTH AND MATURATION
(2.1.2.3.3.) ENVIRONMENTAL CONTEXT

Figure 15. A Two-Level Branching Network of Growth and Development Characteristics

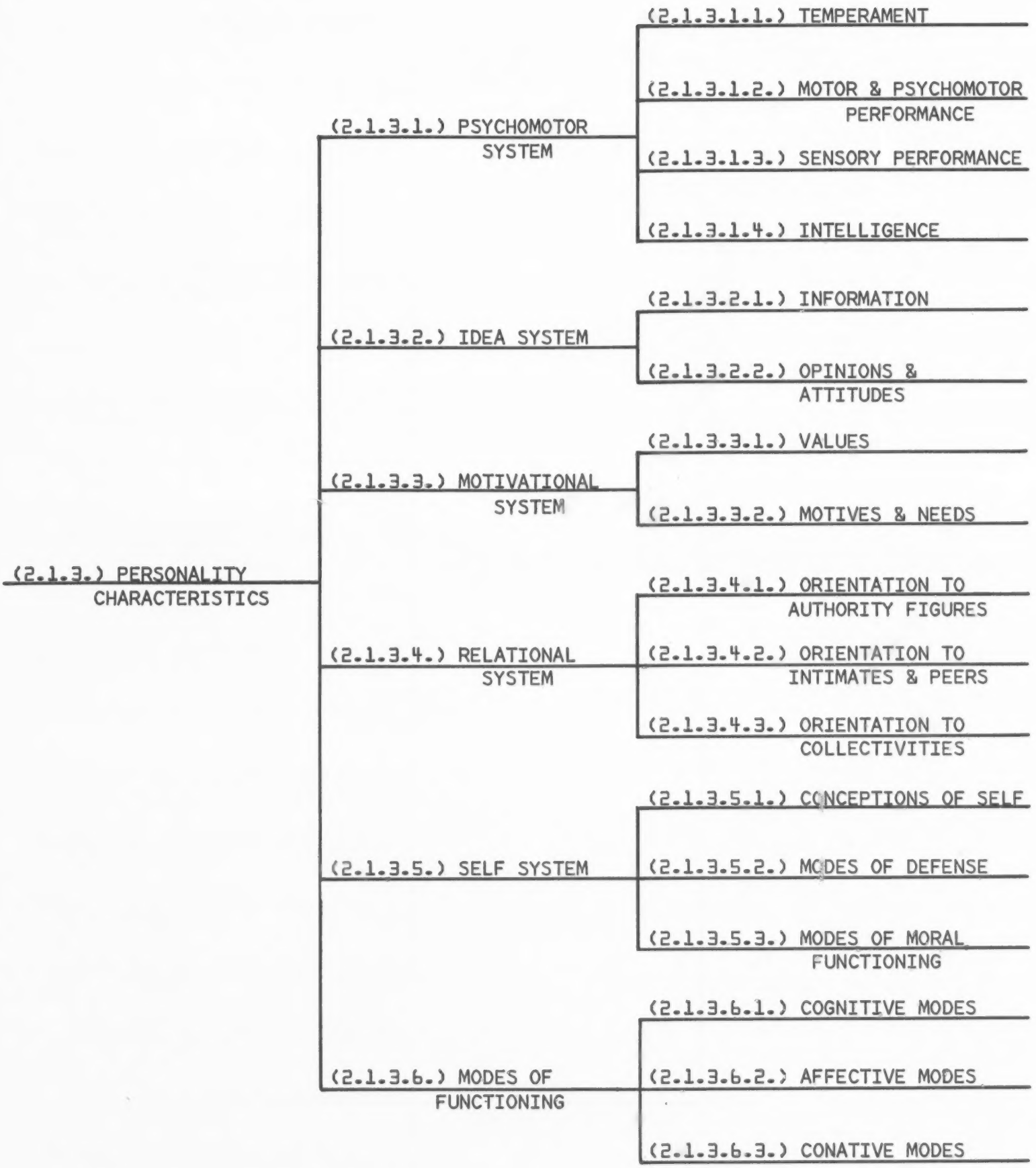
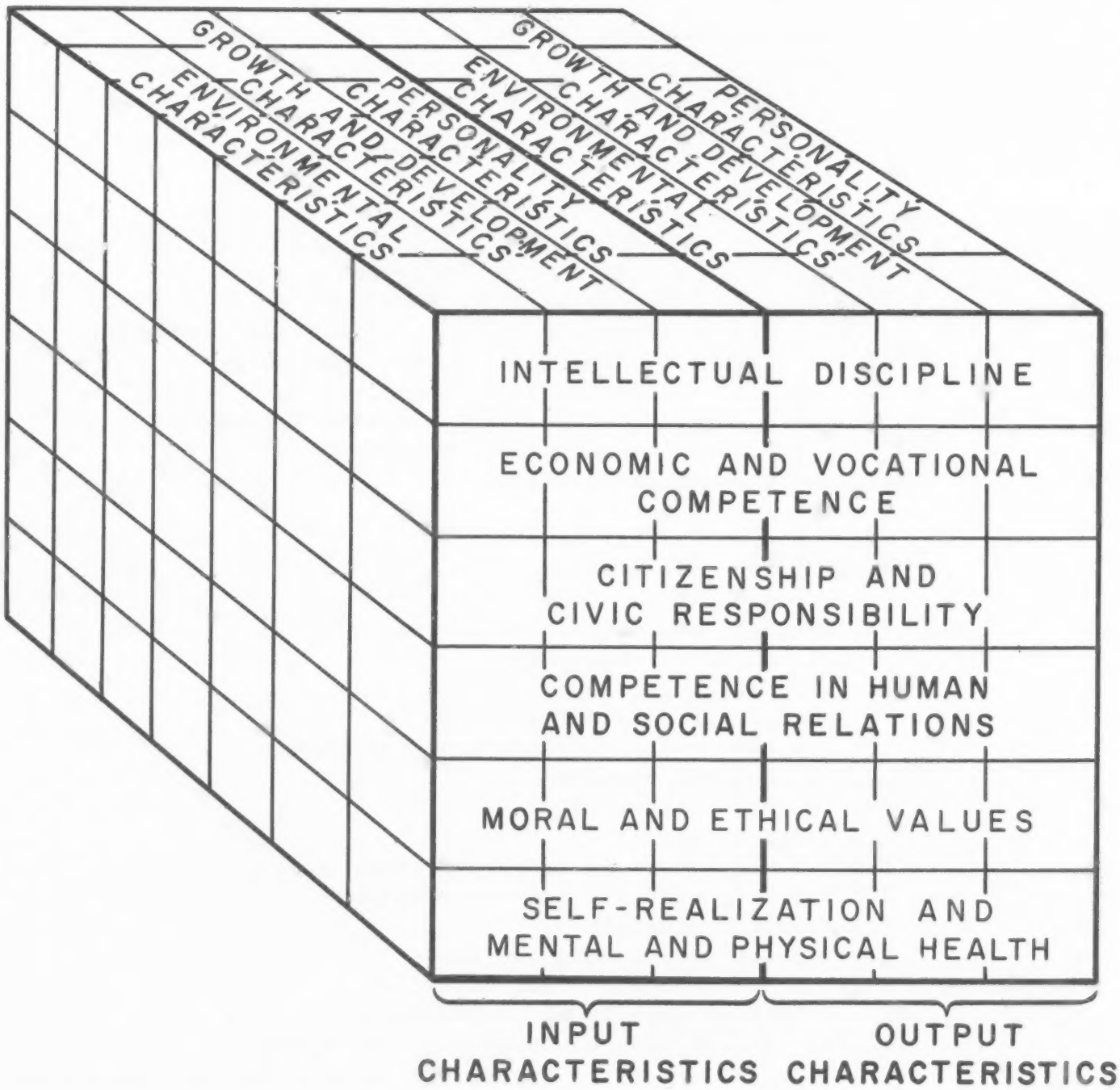


Figure 16. A Two-Level Branching Network of Personality Characteristics

Figure 17

EDUCATIONAL GOALS AND CHANGE CHARACTERISTICS



2.0 CHANGE CHARACTERISTICS

2.1 Input Characteristics
- 2.1.1 Environmental Characteristics
  - 2.1.1.1 geophysical aspects of environment
    - 2.1.1.1.1 location and topography
      - 2.1.1.1.1.1 latitude and longitude
      - 2.1.1.1.1.2 topographical characteristics
      - 2.1.1.1.1.3 remoteness from centers of population
    - 2.1.1.1.2 physical constraints on human habitation
      - 2.1.1.1.2.1 radiation, contamination and pollution
      - 2.1.1.1.2.2 lack of natural resources
      - 2.1.1.1.2.3 adverse climatic conditions
      - 2.1.1.1.2.4 unfavorable natural habitats and topography
    - 2.1.1.1.3 physical dimensions, forces and energy
      - 2.1.1.1.3.1 spatio-temporal dimensions
      - 2.1.1.1.3.2 gravitational and magnetic forces
      - 2.1.1.1.3.3 solar and atomic energy
    - 2.1.1.1.4 weather and climate
      - 2.1.1.1.4.1 insolation
      - 2.1.1.1.4.2 air temperature
      - 2.1.1.1.4.3 air pressure
      - 2.1.1.1.4.4 winds
      - 2.1.1.1.4.5 atmospheric moisture
        - 2.1.1.1.4.5.1 humidity
        - 2.1.1.1.4.5.2 clouds and fog
        - 2.1.1.1.4.5.3 precipitation
      - 2.1.1.1.4.6 cyclic phenomena and patterns
    - 2.1.1.1.5 natural resources
      - 2.1.1.1.5.1 water
      - 2.1.1.1.5.2 soil
      - 2.1.1.1.5.3 forests, range and other plants
      - 2.1.1.1.5.4 wildlife and other animals
      - 2.1.1.1.5.5 minerals
      - 2.1.1.1.5.6 atmosphere and space
      - 2.1.1.1.5.7 sun and solar radiation
  - 2.1.1.2 ecological aspects of environment
    - 2.1.1.2.1 ecosystems, habitats and life space
      - 2.1.1.2.1.1 ecosystem types, characteristics and components
      - 2.1.1.2.1.2 attributes of human habitats
      - 2.1.1.2.1.3 life space or territory of the individual
      - 2.1.1.2.1.4 ecological niche of the individual
      - 2.1.1.2.1.5 patterns of energy flow and circulation of materials
      - 2.1.1.2.1.6 food chains
    - 2.1.1.2.2 biogeochemical cycles, patterns and trends

2.1.1.2.2.1 essential life nutrients
2.1.1.2.2.2 carbon, sulfur, oxygen and nitrogen cycles
2.1.1.2.3 succession, control and evolution
2.1.1.2.3.1 interaction between energy, materials, conditions and community in ecological regulation
2.1.1.2.3.2 ecological succession
2.1.1.2.3.3 biological control
2.1.1.2.3.4 ecological and cultural evolution
2.1.1.2.4 society-environment impact problems
2.1.1.2.4.1 radioactivity and radioactive fallout
2.1.1.2.4.2 water and air pollution
2.1.1.2.4.3 contamination of plant and animal resources
2.1.1.2.4.4 population explosions, urban congestion and blight
2.1.1.2.4.5 effect of urban, industrial and technical civilization on personalities of individual human beings
2.1.1.2.4.6 greenhouse effect of increased levels of atmospheric carbon dioxide
2.1.1.2.4.7 intra- and inter-societal agression resulting from environmental and ecological factors
2.1.1.2.4.8 unsatisfactory waste disposal methods (gaseous, liquid and solid)
2.1.1.2.4.9 exploitation and depletion of non-renewable natural resources
2.1.1.2.4.10 ineffective conservation and management practices relative to utilization of natural resources
2.1.1.2.4.11 destruction, removal and/or renewal of material culture products and facilities
2.1.1.3 cultural aspects of environment
2.1.1.3.1 aspects of material culture
2.1.1.3.1.1 centers of population and human activity
2.1.1.3.1.2 man-made facilities and structures
2.1.1.3.1.3 technological products and residues
2.1.1.3.1.4 products of the arts and crafts
2.1.1.3.2 nonmaterial aspects of culture
2.1.1.3.2.1 social structure and human relationships
2.1.1.3.2.1.1 cognitive, affective and conative aspects
2.1.1.3.2.1.2 membership requirements and criteria
2.1.1.3.2.1.3 goal orientation
2.1.1.3.2.1.4 functional (role) differentiation
2.1.1.3.2.1.5 institutionalized inequality
2.1.1.3.2.1.6 social stratification
2.1.1.3.2.1.7 ascriptive and ethnic solidarities
2.1.1.3.2.1.8 social integration and expression
2.1.1.3.2.1.9 political, economic and technical allocation
2.1.1.3.2.2 organizational contexts of society
2.1.1.3.2.2.1 kinship and family organizations
2.1.1.3.2.2.2 governments and associated organizations
2.1.1.3.2.2.3 military organizations
2.1.1.3.2.2.4 religious organizations
2.1.1.3.2.2.5 educational organizations
2.1.1.3.2.2.6 economically-oriented organizations
2.1.1.3.2.2.7 politically-oriented organizations
2.1.1.3.2.2.8 recreationally-oriented organizations

2.1.1.3.2.2.9 primary groups and community organizations
2.1.1.3.2.2.10 labor unions and social welfare organizations
2.1.1.3.2.2.11 eleemosynary agencies and organizations
2.1.1.3.2.2.12 other organizations
2.1.1.3.2.3 occupations and economy
2.1.1.3.2.4 mobility of population
2.1.1.3.2.5 religion and moral patterns
2.1.1.3.2.6 linguistic patterns and communication
2.1.1.3.2.7 education and information technology
2.1.1.3.2.8 low and ethical patterns
2.1.1.3.2.9 recreation, entertainment and the arts
2.1.1.3.2.10 science, technology and ideology
2.1.1.3.2.11 value systems, beliefs and symbolic systems
2.1.1.3.2.12 health and welfare
2.1.1.4 societal aspects of environment
2.1.1.4.1 demographic aspects of society
2.1.1.4.1.1 population characteristics
2.1.1.4.1.1.1 age and sex
2.1.1.4.1.1.2 racial origins and composition
2.1.1.4.1.1.3 ethnic origins and composition
2.1.1.4.1.1.4 immigration status
2.1.1.4.1.1.5 religious preferences
2.1.1.4.1.1.6 educational attainment
2.1.1.4.1.1.7 political and economic activity
2.1.1.4.1.1.8 income and expenditures
2.1.1.4.1.1.9 internal migration
2.1.1.4.1.1.10 families and households
2.1.1.4.1.1.11 marriages and divorces
2.1.1.4.1.1.12 size, density and distribution
2.1.1.4.1.1.13 health and disease
2.1.1.4.1.1.14 births, deaths and fertility
2.1.1.4.1.2 population trends
2.1.1.4.1.2.1 gross population changes
2.1.1.4.1.2.2 influx and mobility trends
2.1.1.4.1.2.3 urbanization
2.1.1.4.1.2.4 growth and migration of racial and ethnic minority populations
2.1.1.4.1.2.5 assimilation of foreign-born
2.1.1.4.1.2.6 changes in population characteristics
2.1.1.4.1.2.7 changes in occupational patterns
2.1.1.4.1.2.8 changes in educational attainment and vocational training
2.1.1.4.2 functional modes and states
2.1.1.4.2.1 life styles and statuses
2.1.1.4.2.2 political modes and states
2.1.1.4.2.3 legal and ethical modes and states
2.1.1.4.2.4 social modes and states
2.1.1.4.2.5 technical modes and states
2.1.1.4.2.6 economic modes and states
2.1.1.4.2.7 religious and moral modes and states
2.1.2 Growth and Development Characteristics
2.1.2.1 structural aspects
2.1.2.1.1 growth

2.1.2.1.1.1 height or stature
2.1.2.1.1.2 width or horizontal girth of body segments
2.1.2.1.1.3 relative length of body segments
2.1.2.1.1.4 body weight
2.1.2.1.2 maturation
2.1.2.1.2.1 skeletal development
2.1.2.1.2.2 dental development
2.1.2.1.2.3 nervous system development
2.1.2.1.2.4 morphological development
2.1.2.1.2.5 secondary sexual characteristics
2.1.2.2 functional aspects
2.1.2.2.1 getting and processing food
2.1.2.2.1.1 mobilization
2.1.2.2.1.2 acquisition and ingestion
2.1.2.2.1.3 mechanical and chemical digestion
2.1.2.2.2 absorbing and transporting vital substances
2.1.2.2.2.1 dissolved nutrients and gases
2.1.2.2.2.2 hormones and antibodies
2.1.2.2.2.3 antigens and waste products
2.1.2.2.3 regulating chemical composition
2.1.2.2.3.1 water balance
2.1.2.2.3.2 excretion
2.1.2.2.3.3 reabsorption of vital substances
2.1.2.2.4 maintaining body framework
2.1.2.2.4.1 external covering and skin
2.1.2.2.4.2 skeleton
2.1.2.2.4.3 muscles and cartilages
2.1.2.2.5 maint ining physical and mental health
2.1.2.2.5.1 repairing damaged tissue
2.1.2.2.5.2 sleeping and resting
2.1.2.2.5.3 rationalizing one's existence and being
2.1.2.2.5.4 coping with crises, conflicts and stresses
2.1.2.2.5.5 adapting and accommodating to externalities
2.1.2.2.5.6 dealing with the retrospective and prospective aspects of reality
2.1.2.2.5.7 orienting oneself to space and time
2.1.2.2.6 exchanging gases with the environment
2.1.2.2.6.1 inspiration and expiration
2.1.2.2.6.2 respiration
2.1.2.2.7 regulating metabolic processes
2.1.2.2.7.1 controlling body temperature and energy release
2.1.2.2.7.2 decomposing organic substances
2.1.2.2.7.3 synthesizing organic substances
2.1.2.2.7.4 oxidizing organic substances
2.1.2.2.7.5 assimilating organic substances
2.1.2.2.8 regulating vital systems
2.1.2.2.8.1 endocrine system
2.1.2.2.8.2 central and autonomic nervous systems
2.1.2.2.8.3 reproductive system
2.1.2.2.8.4 cardio-vascular and blood systems
2.1.2.2.8.5 respiratory system
2.1.2.2.8.6 gastro-intestinal system
2.1.2.2.8.7 urinary system

2.1.2.2.8.8 lymphatic system
2.1.2.2.9 producing new generations
2.1.2.2.9.1 heterosexual relations
2.1.2.2.9.2 biological aspects of reproduction
2.1.2.2.9.3 embryonic and prenatal development
2.1.2.2.9.4 physiology and psychology of birth
2.1.2.2.10 moving and mobility
2.1.2.2.10.1 coordination and locomotion
2.1.2.2.10.2 balance and posture
2.1.2.2.10.3 flexibility and agility
2.1.2.2.11 maintaining irritability
2.1.2.2.11.1 sensing externalities
2.1.2.2.11.2 sensing internal conditions
2.1.2.2.11.3 responding to stimuli
2.1.2.2.12 growing and developing as an organism
2.1.2.2.12.1 physical aspects and characteristics
2.1.2.2.12.2 mental aspects and characteristics
2.1.2.2.13 reasoning and deciding actions
2.1.2.2.13.1 perceiving, behaving and becoming
2.1.2.2.13.2 problem finding and problem solving
2.1.2.2.13.3 goal setting and ordering
2.1.2.2.13.4 selecting preferred choices and consequences
2.1.2.2.13.5 planning, programming and budgeting actions
2.1.2.2.14 communicating with others
2.1.2.2.14.1 learning to use new methods-means-media
2.1.2.2.14.2 encoding and transmitting messages
2.1.2.2.14.3 receiving and decoding messages
2.1.2.3 influential aspects
2.1.2.3.1 personal characteristics
2.1.2.3.1.1 sex
2.1.2.3.1.2 personality and state of being
2.1.2.3.2 states of health and maturation
2.1.2.3.2.1 states of physical and mental health
2.1.2.3.2.2 states of physical and mental maturation
2.1.2.3.3 environmental context
2.1.2.3.3.1 environmental conditions and situations
2.1.2.3.3.2 geophysical and ecological aspects
2.1.2.3.3.3 cultural and societal aspects
2.1.3 Personality Characteristics*
2.1.3.1 psychomotor system
2.1.3.1.1 temperament
2.1.3.1.1.1 apathetic
2.1.3.1.1.2 active
2.1.3.1.1.3 perseverative
2.1.3.1.1.4 vigorous
2.1.3.1.1.5 impulsive

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*The breakout of personality characteristics presented in this document was developed by James J. Dillon and S. Shirley Feldman as reported in An Accounting Scheme for Personality Study (Burlingame, California: OPERATION PEP, 1970), pp. 4-26.

2.1.3.1.1.6 dominant
2.1.3.1.1.7 stable
2.1.3.1.1.8 reflective
2.1.3.1.2 motor and psychomotor performance
2.1.3.1.2.1 developing lateral dominance
2.1.3.1.2.2 developing abilities which permit the individual to learn motor skills easily
2.1.3.1.2.2.1 developing agility
2.1.3.1.2.2.2 developing balance
2.1.3.1.2.2.3 developing control
2.1.3.1.2.2.4 developing flexibility
2.1.3.1.2.2.5 developing arm-hand steadiness
2.1.3.1.2.2.6 developing rate of arm movement
2.1.3.1.2.2.7 developing finger dexterity
2.1.3.1.2.2.8 developing postural discrimination
2.1.3.1.2.2.9 developing fine psychomotor coordination (visual pursuit)
2.1.3.1.2.2.10 developing manual dexterity
2.1.3.1.2.2.11 developing multiple limb coordination
2.1.3.1.2.2.12 developing rate control
2.1.3.1.2.2.13 developing response orientation
2.1.3.1.2.2.14 developing response integration
2.1.3.1.3 sensory performance
2.1.3.1.3.1 visual abilities
2.1.3.1.3.1.1 developing visual acuity
2.1.3.1.3.1.2 developing visual fusion
2.1.3.1.3.1.3 developing depth perception
2.1.3.1.3.1.4 developing visual discrimination
2.1.3.1.3.1.5 developing color perception
2.1.3.1.3.1.6 developing color discrimination
2.1.3.1.3.2 auditory abilities
2.1.3.1.3.2.1 developing auditory acuity
2.1.3.1.3.2.2 developing capacity to localize sound in space
2.1.3.1.3.2.3 developing capacity to discriminate differences in frequency
2.1.3.1.3.2.4 developing capacity to discriminate differences in intensity
2.1.3.1.3.3 tactile abilities
2.1.3.1.3.3.1 developing tactile acuity
2.1.3.1.3.3.2 developing tactile discrimination
2.1.3.1.3.3.3 developing capacity to discriminate differences in size
2.1.3.1.3.3.4 developing capacity to discriminate differences in shape
2.1.3.1.3.3.5 developing capacity to discriminate differences in texture
2.1.3.1.4 intelligence
2.1.3.1.4.1 developing cognitive abilities
2.1.3.1.4.1.1 developing cognition of units
2.1.3.1.4.1.1.1 developing cognition of figural units
2.1.3.1.4.1.1.1.1 developing cognition of visual-figural units

2.1.3.1.4.1.1.1.2 developing cognition of auditory-figural units
2.1.3.1.4.1.1.2 developing cognition of symbolic units
2.1.3.1.4.1.1.2.1 developing cognition of visual-symbolic units
2.1.3.1.4.1.1.2.2 developing cognition of auditory-symbolic units
2.1.3.1.4.1.1.3 developing cognition of semantic units
2.1.3.1.4.1.1.4 developing cognition of behavioral units
2.1.3.1.4.1.2 developing cognition of classes
2.1.3.1.4.1.2.1 developing cognition of figural classes
2.1.3.1.4.1.2.2 developing cognition of symbolic classes
2.1.3.1.4.1.2.3 developing cognition of semantic classes
2.1.3.1.4.1.2.4 developing cognition of behavioral classes
2.1.3.1.4.1.3 developing cognition of relations
2.1.3.1.4.1.3.1 developing cognition of figural relations
2.1.3.1.4.1.3.2 developing cognition of symbolic relations
2.1.3.1.4.1.3.3 developing cognition of semantic relations
2.1.3.1.4.1.3.4 developing cognition of behavioral relations
2.1.3.1.4.1.4 developing cognition of systems
2.1.3.1.4.1.4.1 developing cognition of figural systems
2.1.3.1.4.1.4.1.1 developing cognition of visual-figural systems
2.1.3.1.4.1.4.1.2 developing cognition of kinesthetic systems
2.1.3.1.4.1.4.1.3 developing cognition of auditory systems
2.1.3.1.4.1.4.2 developing cognition of symbolic systems
2.1.3.1.4.1.4.3 developing cognition of semantic systems
2.1.3.1.4.1.4.4 developing cognition of behavioral systems
2.1.3.1.4.1.5 developing cognition of transformations
2.1.3.1.4.1.5.1 developing cognition of figural transformations
2.1.3.1.4.1.5.1.1 developing cognition of visual transformations
2.1.3.1.4.1.5.2 developing cognition of symbolic transformations
2.1.3.1.4.1.5.3 developing cognition of semantic transformations
2.1.3.1.4.1.5.4 developing cognition of behavioral transformations
2.1.3.1.4.1.6 developing cognition of implications
2.1.3.1.4.1.6.1 developing cognition of figural implications
2.1.3.1.4.1.6.1.1 developing cognition of visual implications
2.1.3.1.4.1.6.2 developing cognition of symbolic implications
2.1.3.1.4.1.6.3 developing cognition of semantic implications
2.1.3.1.4.1.6.4 developing cognition of behavioral implications

2.1.3.1.4.2 developing memory abilities
2.1.3.1.4.2.1 developing memory for units
2.1.3.1.4.2.1.1 developing memory for figural units
2.1.3.1.4.2.1.2 developing memory for symbolic units
2.1.3.1.4.2.1.3 developing memory for semantic units
2.1.3.1.4.2.2 developing memory for classes
2.1.3.1.4.2.2.1 developing memory for symbolic classes
2.1.3.1.4.2.2.2 developing memory for semantic classes
2.1.3.1.4.2.3 developing memory for relations
2.1.3.1.4.2.3.1 developing memory for symbolic relations
2.1.3.1.4.2.3.2 developing memory for semantic relations
2.1.3.1.4.2.4 developing memory for systems
2.1.3.1.4.2.4.1 developing memory for visual-figural systems
2.1.3.1.4.2.4.2 developing memory for auditory-figural systems
2.1.3.1.4.2.4.3 developing memory for symbolic systems
2.1.3.1.4.2.4.4 developing memory for semantic systems
2.1.3.1.4.2.5 developing memory for transformations
2.1.3.1.4.2.5.1 developing memory for symbolic transformations
2.1.3.1.4.2.5.2 developing memory for semantic transformations
2.1.3.1.4.2.6 developing memory for implications
2.1.3.1.4.2.6.1 developing memory for symbolic implications
2.1.3.1.4.2.6.2 developing memory for semantic transformations
2.1.3.1.4.3 developing divergent-production abilities
2.1.3.1.4.3.1 developing divergent production of units
2.1.3.1.4.3.1.1 developing divergent production of figural units
2.1.3.1.4.3.1.2 developing divergent production of symbolic units
2.1.3.1.4.3.1.3 developing divergent production of semantic units
2.1.3.1.4.3.2 developing divergent production of classes
2.1.3.1.4.3.2.1 developing divergent production of figural classes
2.1.3.1.4.3.2.2 developing divergent production of symbolic classes
2.1.3.1.4.3.2.3 developing divergent production of semantic classes
2.1.3.1.4.3.3 developing divergent production involving relations
2.1.3.1.4.3.3.1 developing divergent production involving symbolic relations
2.1.3.1.4.3.3.2 developing divergent production involving semantic relations
2.1.3.1.4.3.4 developing divergent production of systems
2.1.3.1.4.3.4.1 developing divergent production of figural systems

2.1.3.1.4.3.4.2 developing divergent production of symbolic systems
2.1.3.1.4.3.4.3 developing divergent production of semantic systems
2.1.3.1.4.3.5 developing divergent production of transformations
2.1.3.1.4.3.5.1 developing divergent productions of semantic transformations
2.1.3.1.4.3.6 developing divergent production of implications
2.1.3.1.4.3.6.1 developing divergent production of figural implications
2.1.3.1.4.3.6.2 developing divergent production of symbolic implications
2.1.3.1.4.4 developing convergent-production abilities
2.1.3.1.4.4.1 developing convergent production of units
2.1.3.1.4.4.1.1 developing convergent production of semantic units
2.1.3.1.4.4.2 developing convergent production of classes
2.1.3.1.4.4.2.1 developing convergent production of figural classes
2.1.3.1.4.4.2.2 developing convergent production of semantic classes
2.1.3.1.4.4.3 developing convergent production of relations
2.1.3.1.4.4.3.1 developing convergent production of semantic relations
2.1.3.1.4.4.4 developing convergent production of systems
2.1.3.1.4.4.4.1 developing convergent production of symbolic systems
2.1.3.1.4.4.4.2 developing convergent production of semantic systems
2.1.3.1.4.4.5 developing convergent production of transformations
2.1.3.1.4.4.5.1 developing convergent production of figural transformations
2.1.3.1.4.4.5.2 developing convergent production of symbolic transformations
2.1.3.1.4.4.5.3 developing convergent production of semantic transformations
2.1.3.1.4.4.6 developing convergent production of implications
2.1.3.1.4.4.6.1 developing convergent production of symbolic implications
2.1.3.1.4.4.6.2 developing convergent production of semantic implications
2.1.3.1.4.5 developing evaluative abilities
2.1.3.1.4.5.1 developing evaluation of units
2.1.3.1.4.5.1.1 developing evaluation of figural units
2.1.3.1.4.5.1.2 developing evaluation of symbolic units
2.1.3.1.4.5.1.3 developing evaluation of semantic units
2.1.3.1.4.5.2 developing evaluation of classes
2.1.3.1.4.5.2.1 developing evaluation of symbolic classes
2.1.3.1.4.5.2.2 developing evaluation of semantic classes
2.1.3.1.4.5.3 developing evaluation of relations

2.1.3.1.4.5.3.1 developing evaluation of symbolic relations
2.1.3.1.4.5.3.2 developing evaluation of semantic relations
2.1.3.1.4.5.4 developing evaluation of systems
2.1.3.1.4.5.4.1 developing evaluation of symbolic systems
2.1.3.1.4.5.4.2 developing evaluation of semantic systems
2.1.3.1.4.5.5 developing evaluation of transformations
2.1.3.1.4.5.5.1 developing evaluation of symbolic transformations
2.1.3.1.4.5.5.2 developing evaluation of semantic transformations
2.1.3.1.4.5.6 developing evaluation of implications
2.1.3.1.4.5.6.1 developing evaluation of symbolic implications
2.1.3.1.4.5.6.2 developing evaluation of semantic implications

2.1.3.2 idea system
2.1.3.2.1 information
2.1.3.2.1.1 levels of information
2.1.3.2.1.1.1 information about current and historic affairs
2.1.3.2.1.1.1.1 developing and maintaining information about local public places
2.1.3.2.1.1.1.2 developing and maintaining information about state public places
2.1.3.2.1.1.1.3 developing and maintaining information about national public places
2.1.3.2.1.1.1.4 developing and maintaining information about foreign public places
2.1.3.2.1.1.1.5 developing and maintaining information about local public institutions
2.1.3.2.1.1.1.6 developing and maintaining information about state public institutions
2.1.3.2.1.1.1.7 developing and maintaining information about national public institutions
2.1.3.2.1.1.1.8 developing and maintaining information about foreign public institutions
2.1.3.2.1.1.1.9 developing and maintaining information about local public figures and offices
2.1.3.2.1.1.1.10 developing and maintaining information about state public figures and offices
2.1.3.2.1.1.1.11 developing and maintaining information about national public figures and offices
2.1.3.2.1.1.1.12 developing and maintaining information about foreign public figures and offices
2.1.3.2.1.1.1.13 developing and maintaining information about local public events
2.1.3.2.1.1.1.14 developing and maintaining information about state public events
2.1.3.2.1.1.1.15 developing and maintaining information about national public events
2.1.3.2.1.1.1.16 developing and maintaining information about foreign public events

2.1.3.2.1.1.2 information about practical affairs (vocational development)

2.1.3.2.1.1.2.1 identifying with a worker--the concept of working becomes an essential part of the ego ideal

2.1.3.2.1.1.2.1.1 developing increasing ability for self-help

2.1.3.2.1.1.2.1.2 developing identification with like-sexed parent

2.1.3.2.1.1.2.1.3 developing increasing ability for self-direction

2.1.3.2.1.1.2.2 acquiring the basic habits of industry--learning to organize one's time and energy to get chores and school work done

2.1.3.2.1.1.2.2.1 developing ability to undertake cooperative enterprises

2.1.3.2.1.1.2.2.2 choosing activities suited to one's abilities

2.1.3.2.1.1.2.2.3 assuming responsibility for one's acts

2.1.3.2.1.1.2.2.4 performing chores around the house

2.1.3.2.1.1.2.3 acquiring identity as a worker--choosing and preparing for an occupation

2.1.3.2.1.1.2.3.1 developing abilities and talents

2.1.3.2.1.1.2.3.2 choosing high school or work

2.1.3.2.1.1.2.3.3 choosing high school curriculum

2.1.3.2.1.1.2.3.4 developing independence

2.1.3.2.1.1.2.4 becoming a productive person--mastering the skills of one's occupation

2.1.3.2.1.1.2.4.1 choosing college or work

2.1.3.2.1.1.2.4.2 choosing college curriculum

2.1.3.2.1.1.2.4.3 choosing suitable job

2.1.3.2.1.1.2.4.4 developing skills on the job

2.1.3.2.1.1.2.4.5 stabilizing in an occupation

2.1.3.2.1.1.2.4.6 providing for future security

2.1.3.2.1.1.2.4.7 finding appropriate avenues of advancement

2.1.3.2.1.1.3 information about useful affairs

2.1.3.2.1.1.3.1 comprehending the essential benefits of society

2.1.3.2.1.1.3.1.1 realizing the benefits of educational facilities

2.1.3.2.1.1.3.1.2 realizing the benefits of vocational facilities

2.1.3.2.1.1.3.1.3 realizing the benefits of health and welfare facilities

2.1.3.2.1.1.3.1.4 realizing the benefits of leisure facilities

2.1.3.2.1.1.3.2 acquiring the information and skills necessary to successfully utilize these benefits

2.1.3.2.1.2 styles of thinking

2.1.3.2.1.2.1 developing skills to inquire, investigate and solve problems by intellectual methods, techniques and procedures

2.1.3.2.1.2.1.1 maintaining an attitude of open-mindedness

2.1.3.2.1.2.1.2 thinking, reasoning and solving problems independently

2.1.3.2.1.2.1.3 solving one's problems of counting and calculating

2.1.3.2.1.2.1.4 developing inquiry, investigation and problem-solving methods, techniques and procedures

2.1.3.2.1.2.1.5 adopting effective strategies for analysis, evaluation and interpretation of information

2.1.3.2.1.2.1.6 discriminating similarities and differences

2.1.3.2.1.2.1.7 inferring, predicting and experimenting

2.1.3.2.1.2.1.8 formulating hypotheses and assessing alternative choice-consequence relations

2.1.3.2.1.2.2 developing strategies in which inquiry, investigation and problem solving are conducted by symbolic manipulation and expression

2.1.3.2.2 opinions and attitudes

2.1.3.2.2.1 society

2.1.3.2.2.2 education

2.1.3.2.2.3 work

2.1.3.2.2.4 sex

2.1.3.2.2.5 marriage

2.1.3.2.2.6 family

2.1.3.2.2.7 war

2.1.3.2.2.8 ethnic and racial groups

2.1.3.2.2.9 church

2.1.3.2.2.10 censorship

2.1.3.2.2.11 patriotism

2.1.3.2.2.12 politics

2.1.3.2.2.13 economic

2.1.3.3 motivational system

2.1.3.3.1 values

2.1.3.3.1.1 developing values

2.1.3.3.1.1.1 comprehending and valuing oneself

2.1.3.3.1.1.1.1 comprehending the value of independence

2.1.3.3.1.1.1.2 comprehending the value of emotional independence

2.1.3.3.1.1.1.3 comprehending the value of economic independence

2.1.3.3.1.1.1.4 comprehending the value of self-directed behavior

2.1.3.3.1.1.1.5 comprehending the value of self-controlled behavior

2.1.3.3.1.1.1.6 comprehending the value of self identification of purpose

2.1.3.3.1.1.2 comprehending and valuing others

2.1.3.3.1.1.2.1 developing an awareness of the values of human resources

2.1.3.3.1.1.2.2 developing an awareness of the values of adult status in the social structure
2.1.3.3.1.1.2.3 developing an awareness of the values of interpersonal relations
2.1.3.3.1.1.2.4 developing an awareness of the values of societal ideals
2.1.3.3.1.1.2.5 developing an awareness of the values of civic competence
2.1.3.3.1.2 developing competence in appraising
2.1.3.3.1.2.1 developing awareness of the diversity of values and value systems
2.1.3.3.1.2.2 demanding evidence before acceptance of values
2.1.3.3.1.2.3 developing receptivity for values and value systems
2.1.3.3.1.2.4 developing ability to appraise or evaluate over-all values
2.1.3.3.1.2.5 developing the ability to appraise values and value systems as they effect the entire structure of society
2.1.3.3.1.2.6 developing the ability to appraise values and value systems in terms of their multi-dimensional aspects
2.1.3.3.1.3 developing competence in exercising values
2.1.3.3.1.3.1 possessing the cognitive capacity to understand the effect of values
2.1.3.3.1.3.2 exercising values consistently
2.1.3.3.1.3.3 developing skills in communicating values
2.1.3.3.1.3.4 articulating values clearly
2.1.3.3.1.3.5 developing skills in convincing others of one's values
2.1.3.3.1.3.6 developing the ability to maintain autonomy despite adverse pressures
2.1.3.3.2 motives and needs
2.1.3.3.2.1 self
2.1.3.3.2.1.1 identity
2.1.3.3.2.1.1.1 developing a sense of identity, self-sameness and self-persistence
2.1.3.3.2.1.1.2 demonstrating the ability to distinguish reality from non-reality
2.1.3.3.2.1.1.3 developing the capacity to adjust mode of living to reality
2.1.3.3.2.1.1.4 developing the capacity to accept reality
2.1.3.3.2.1.1.5 developing a taste for change
2.1.3.3.2.1.1.6 developing harmonious relations with oneself and one's ideals
2.1.3.3.2.1.1.7 developing the ability to see and assess the relationship between oneself and society
2.1.3.3.2.1.2 autonomy
2.1.3.3.2.1.2.1 realizing the need for independence

2.1.3.3.2.1.2.2 moving toward emotional independence
2.1.3.3.2.1.2.3 moving toward economic independence
2.1.3.3.2.1.2.4 maintaining one's own affairs
2.1.3.3.2.1.2.5 maintaining self-directed behavior
2.1.3.3.2.1.2.6 maintaining self-controlled behavior
2.1.3.3.2.1.2.7 maintaining self identification of purpose
2.1.3.3.2.1.2.8 moving toward intellectual independence
2.1.3.3.2.1.3 efficacy
2.1.3.3.2.1.3.1 developing consciousness of self potential
2.1.3.3.2.1.3.2 developing initiative
2.1.3.3.2.1.3.3 developing creativity
2.1.3.3.2.1.3.4 developing productivity
2.1.3.3.2.2 society
2.1.3.3.2.2.1 identity
2.1.3.3.2.2.1.1 desiring social status of adults
2.1.3.3.2.2.1.2 accepting ideals of society
2.1.3.3.2.2.1.3 internalizing ideals of society
2.1.3.3.2.2.1.4 desiring and achieving socially responsible behavior
2.1.3.3.2.2.2 affiliation
2.1.3.3.2.2.2.1 developing trust of others
2.1.3.3.2.2.2.2 maintaining and respecting human relations
2.1.3.3.2.2.2.3 engaging in varied social relations
2.1.3.3.2.2.2.4 developing an awareness of responsibility to society in general
2.1.3.3.2.2.2.5 developing an awareness of responsibility to specific members of society
2.1.3.3.2.2.2.6 respecting the rights of others
2.1.3.3.2.2.3 efficacy
2.1.3.3.2.2.3.1 developing skills in interpersonal relations
2.1.3.3.2.2.3.2 developing intellectual skills and concepts necessary for civic competence
2.1.3.3.2.2.3.3 developing assurance of economic independence
2.1.3.4 relational system
2.1.3.4.1 orientation to authority figures
2.1.3.4.1.1 recognizing authority and regulating behavior accordingly
2.1.3.4.1.2 evaluating authority critically
2.1.3.4.1.3 accepting legitimacy of direct or indirect attempts from authority to influence
2.1.3.4.1.4 attributing positive characteristics to authority
2.1.3.4.1.5 admiring an authority
2.1.3.4.1.6 supporting and following an authority
2.1.3.4.1.7 initiating approval-seeking behavior and directing it toward authority
2.1.3.4.1.8 developing ability to control and channel needs to meet the restrictions placed on one in society
2.1.3.4.1.9 developing capacity to comply with decisions of authority

2.1.3.4.1.10 developing ability to execute plans as defined by authority
2.1.3.4.1.11 recognizing difference between position of authority and person who fills the position
2.1.3.4.2 orientation to intimates and peers
2.1.3.4.2.1 seeking relatedness, a sense of belonging
2.1.3.4.2.2 seeking a frame of orientation
2.1.3.4.2.3 sharing relatedness in space
2.1.3.4.2.4 sharing activities, codes of behavior and controls
2.1.3.4.2.5 developing relational sentiments
2.1.3.4.2.5.1 developing liking
2.1.3.4.2.5.2 developing acceptance
2.1.3.4.2.5.3 developing trust
2.1.3.4.2.5.4 developing admiration
2.1.3.4.2.6 developing relational behavior
2.1.3.4.2.6.1 developing reciprocity
2.1.3.4.2.6.2 developing confidence
2.1.3.4.2.6.3 developing influence
2.1.3.4.2.6.4 developing cooperation
2.1.3.4.2.6.5 developing need gratification
2.1.3.4.2.6.5.1 seeking/giving aid of/to another person
2.1.3.4.2.6.5.2 seeking/giving support of/to another person
2.1.3.4.2.6.5.3 seeking/giving protection of/to another person
2.1.3.4.2.7 providing role support
2.1.3.4.2.8 providing value support
2.1.3.4.2.9 evaluating others in terms of meeting one's own needs
2.1.3.4.2.10 accepting differences of one's intimates and peers
2.1.3.4.3 orientation to collectivities
2.1.3.4.3.1 needing, seeking and finding relatedness/affiliation
2.1.3.4.3.2 needing, seeking and finding a frame of orientation
2.1.3.4.3.3 needing to be a member of an existing group
2.1.3.4.3.4 needing to associate with members of a group
2.1.3.4.3.5 needing to have a defined and accepted role and status in the group
2.1.3.4.3.6 finding security in membership activities
2.1.3.4.3.7 developing relational sentiments
2.1.3.4.3.7.1 developing liking for the group
2.1.3.4.3.7.2 developing acceptance for the group
2.1.3.4.3.7.3 developing trust for the group
2.1.3.4.3.7.4 developing admiration for the group
2.1.3.4.3.8 attributing positive characteristics to the group
2.1.3.4.3.9 developing congruence of goals
2.1.3.4.3.10 assuming responsive activities with the group
2.1.3.4.3.11 belonging to and participating in a functioning group
2.1.3.4.3.12 adhering to group standards
2.1.3.4.3.13 sharing activities, codes of behavior, controls, beliefs and characteristics
2.1.3.4.3.14 conforming to group customs and roles

2.1.3.4.3.15 developing interpersonal skills and clarity of communication
2.1.3.4.3.16 sharing relatedness in space
2.1.3.4.3.17 recognizing group goals, activities and needs
2.1.3.4.3.18 exerting interpersonal influence on other members in the group
2.1.3.4.3.19 yielding to the influence of others
2.1.3.4.3.20 providing mutual support
2.1.3.4.3.21 playing a repertoire of roles in terms of age, sex, occupation, religion and other groups to which individual belongs
2.1.3.4.3.22 developing ability to play a differentiated role; differentiating activities to suit varied group demands
2.1.3.4.3.23 evaluating groups critically in terms of one's needs, attitudes, beliefs and behaviors
2.1.3.4.3.24 differentiating behaviors for different groups
2.1.3.4.3.25 participating in group decision making
2.1.3.4.3.26 tolerating other collectivities although one is not a member
2.1.3.4.3.27 relating to others as individuals rather than group to which they belong
2.1.3.4.3.28 developing abilities to recognize people as distinct from group to which they belong

2.1.3.5 self system
- 2.1.3.5.1 conception of self
  - 2.1.3.5.1.1 self formation
    - 2.1.3.5.1.1.1 acquiring and inferring information which contributes to formation of self
    - 2.1.3.5.1.1.2 acquiring and inferring information which contributes to sex identity
  - 2.1.3.5.1.2 self definition
    - 2.1.3.5.1.2.1 learning who one is
    - 2.1.3.5.1.2.2 learning what one feels
    - 2.1.3.5.1.2.3 learning what one can do
    - 2.1.3.5.1.2.4 learning what one wants to become
    - 2.1.3.5.1.2.5 learning what others feel
    - 2.1.3.5.1.2.6 learning who one was
    - 2.1.3.5.1.2.7 learning what one felt
  - 2.1.3.5.1.3 self assessment
    - 2.1.3.5.1.3.1 evaluating one's abilities
  - 2.1.3.5.1.4 self acceptance
    - 2.1.3.5.1.4.1 recognizing one's abilities and finding them of worth
    - 2.1.3.5.1.4.2 assessing accurately one's abilities
  - 2.1.3.5.1.5 self realization
    - 2.1.3.5.1.5.1 actualizing harmonious development of all aspects of one's personality
    - 2.1.3.5.1.5.2 realizing self definition
    - 2.1.3.5.1.5.3 reconciling interests and abilities
- 2.1.3.5.2 modes of defense
  - 2.1.3.5.2.1 misinterpreting the event
  - 2.1.3.5.2.2 reinterpreting the event

2.1.3.5.2.3 repressing the event
2.1.3.5.2.4 avoiding responsibility or blame for actions
2.1.3.5.2.5 denying responsibility or blame for actions
2.1.3.5.2.6 withdrawing from event or situation
2.1.3.5.2.7 rationalizing reasons or motives for actions
2.1.3.5.2.8 regressing in behavior
2.1.3.5.2.9 displacing affect from event onto something other than its proper object
2.1.3.5.2.10 facing up to the problem
2.1.3.5.3 modes of moral functioning
2.1.3.5.3.1 development of moral behaviors and moral values
2.1.3.5.3.1.1 developing behavior based on internal sanctions
2.1.3.5.3.1.2 developing internal reactions to transgression in the form of guilt
2.1.3.5.3.1.3 developing moral standards for which one feels a responsibility for maintaining
2.1.3.5.3.1.4 developing ability to resist temptation
2.1.3.5.3.1.5 developing flexibility to prohibition
2.1.3.5.3.1.6 developing generalized and abstract standards
2.1.3.5.3.1.7 developing a sense of equality where moral judgments take into account specific situations
2.1.3.5.3.1.8 developing moral standards which depend on a sense of balance and judgment
2.1.3.5.3.1.9 developing the ability to justify maintaining an internalized standard of morality to oneself and to others
2.1.3.5.3.1.10 developing moral standards where rules and judgments depend on cooperation and respect for others
2.1.3.5.3.1.11 developing moral standards where rules and moral judgment depend on needs and desires of the group
2.1.3.6 modes of functioning
2.1.3.6.1 cognitive modes
2.1.3.6.1.1 cognitive processes
2.1.3.6.1.1.1 perceiving information about environmental events and objects through excitation of the sensory receptors
2.1.3.6.1.1.2 discriminating the qualitative or quantitative differences between environmental events and objects
2.1.3.6.1.1.3 isolating properties which make an environmental event or object unique
2.1.3.6.1.1.4 recognizing whether or not an environmental event or object has been previously experienced
2.1.3.6.1.1.5 ascribing certain properties of the environmental event or object to several similar events or objects
2.1.3.6.1.1.6 discovering that a single property can be common to a class of environmental events or objects

2.1.3.6.1.1.7 organizing diverse environmental events or objects to classes and categories on the basis of their various similarities and/or differences
2.1.3.6.1.1.8 discovering that a single idea or concept represents a number of individual items or events all of which have some property in common
2.1.3.6.1.1.9 discovering and asserting a relationship between two or more environmental events or objects
2.1.3.6.1.1.10 generating rules regarding class membership
2.1.3.6.1.1.11 expressing rules regarding class membership
2.1.3.6.1.1.12 developing a set of behaviors congruent with concept of classes
2.1.3.6.1.1.13 discovering the appropriate concepts that will put a group of facts about the properties of environmental events or objects into a rational or useful order
2.1.3.6.1.1.14 developing a set of behaviors with which to deal effectively with the environment

2.1.3.6.1.2 cognitive styles
2.1.3.6.1.2.1 developing strategies which characterize the individual's preferred mental processes or ways of acting upon information about environmental events or objects
2.1.3.6.1.2.1.1 divergent-convergent
2.1.3.6.1.2.1.2 focused-diffused
2.1.3.6.1.2.1.3 abstract-concrete
2.1.3.6.1.2.1.4 global-analytic
2.1.3.6.1.2.1.5 reflective-impulsive
2.1.3.6.1.2.1.6 deductive-inductive
2.1.3.6.1.2.1.7 field dependent-field independent

2.1.3.6.1.3 cognitive attitudes
2.1.3.6.1.3.1 developing selectivity of attention
2.1.3.6.1.3.2 developing extensiveness of scanning
2.1.3.6.1.3.3 developing breadth of equivalence range
2.1.3.6.1.3.4 developing tolerance of unrealistic experience
2.1.3.6.1.3.5 developing leveling-sharpening

2.1.3.6.2 affective modes
2.1.3.6.2.1 recognizing one's emotional responses
2.1.3.6.2.2 accepting one's emotional responses
2.1.3.6.2.3 assessing the degree to which emotional responses are congruent with those normally to be expected in a given situation
2.1.3.6.2.4 acting appropriately upon emotional responses
2.1.3.6.2.5 expressing one's emotional responses

2.1.3.6.3 conative modes
2.1.3.6.3.1 facing environmental change
2.1.3.6.3.2 developing an appetite for environmental change
2.1.3.6.3.3 anticipating and adapting oneself to environmental change

2.1.3.6.3.4 altering behavior to account for changes in the environment
2.1.3.6.3.5 reducing differences between familiar and unfamiliar
2.1.3.6.3.6 interpreting the unfamiliar in terms of the familiar
2.1.3.6.3.7 adjusting to environmental change
2.1.3.6.3.8 developing competence for initiating change
2.1.3.6.3.9 identifying goals
2.1.3.6.3.10 striving for goals
  2.1.3.6.3.10.1 assertive-striving
  2.1.3.6.3.10.2 passive-accommodating
2.1.3.6.3.11 integrating and coordinating goal-striving behavior
2.1.3.6.3.12 developing an appetite for learning

Organizational Programs

The organizational programs dimension of the adaptive framework has been subset into seven programs as indicated in Figure 18. The seven sub-dimensions of organizational programs can be subset further as suggested in Figure 19. Each end item program must be regarded as an organizational vehicle for planned change which can be related to specific educational goals and change requirements as suggested in Figure 20.

A program is a collectivity of interrelated organizational inputs (resources, information and energy), activities and events which can be associated with the achievement of specified organizational purposes. The serial set of events associated with a program provides a milestone calendar that can be used to schedule the allocation and utilization of resources in achievement. Milestone event calendars are essential for the development of event-oriented activity networks which can be used to determine the time, cost, value and technical requirements in achievement. Such networks facilitate the use of network-based management procedures that can be used to improve the efficiency and effectiveness of the organization in achievement.

Organizational programs are defined to be as mutually exclusive as possible having minimum degrees of functional and structural overlap with each other. This is an ideal desire that is seldom accomplished in actual practice. Programs should be purposive and output-oriented. In addition, the programs detailed in the adaptive framework are client-centered in the sense that they are designed to provide societal services and/or to develop valued societal products and benefits. The seven sub-dimensions of the organizational programs dimension are based on the results of an

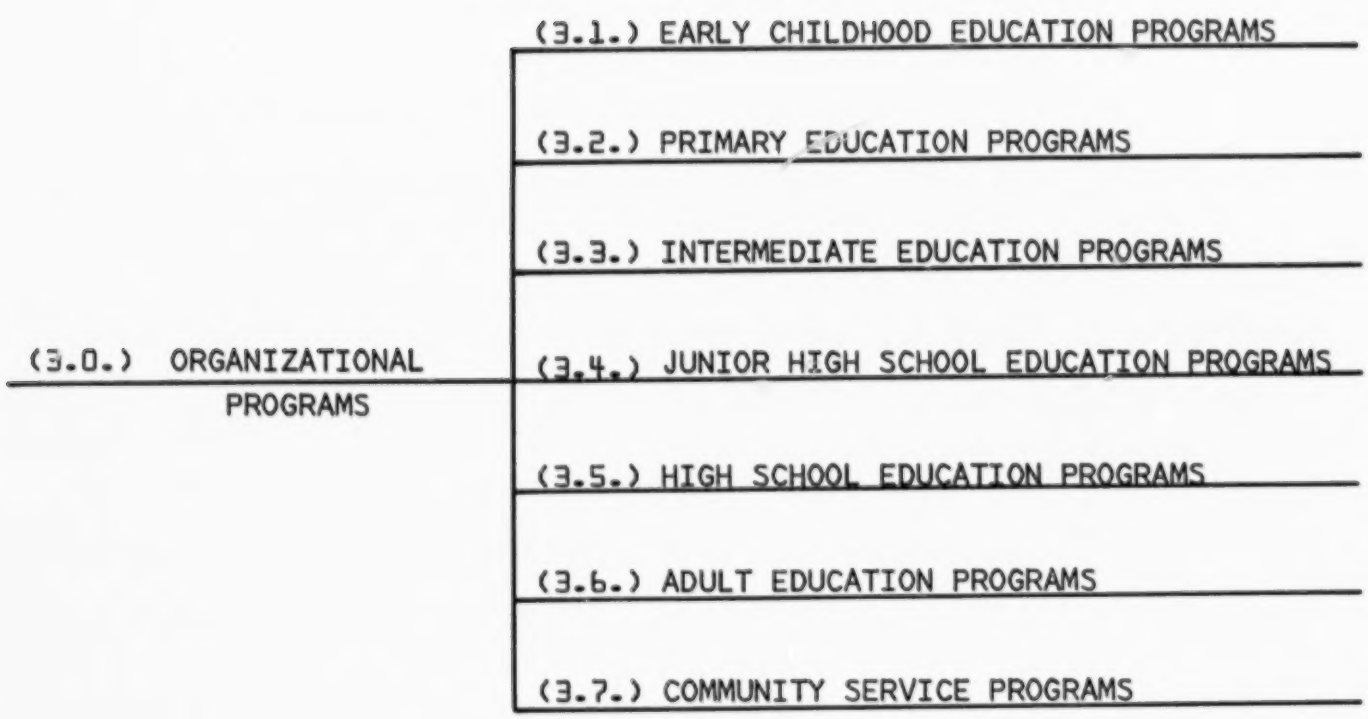

(3.0.) ORGANIZATIONAL PROGRAMS
(3.1.) EARLY CHILDHOOD EDUCATION PROGRAMS
(3.2.) PRIMARY EDUCATION PROGRAMS
(3.3.) INTERMEDIATE EDUCATION PROGRAMS
(3.4.) JUNIOR HIGH SCHOOL EDUCATION PROGRAMS
(3.5.) HIGH SCHOOL EDUCATION PROGRAMS
(3.6.) ADULT EDUCATION PROGRAMS
(3.7.) COMMUNITY SERVICE PROGRAMS

Figure 18. A Simple Branching Network of Organizational Programs

analysis of programs conducted by unified school districts in California.

Figure 20 can be used to appraise the relations between and among the sub-dimensions of organizational programs, change characteristics and educational goals. The addition of the sub-dimensions of organizational programs completes the adaptive framework in its primary form.

A detailed outline of organizational programs reveals that four areas of program support service responsibility are included in each program. These areas of functional responsibility bear important implications for the development of organizational plans and the specification of program management responsibilities. A total of 30 subordinate elements are defined within the seven sub-dimensions of the organizational program dimension of the adaptive framework.

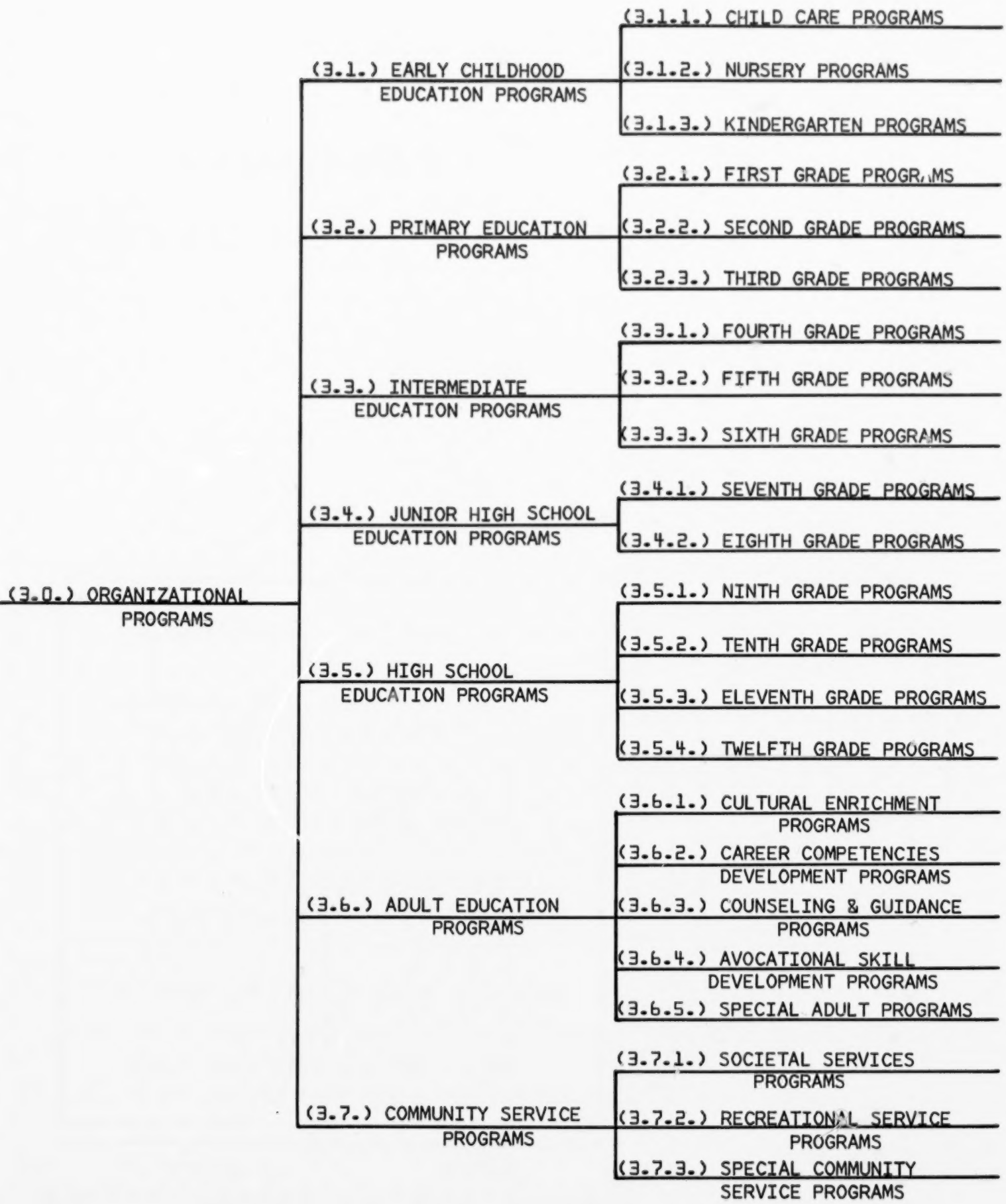
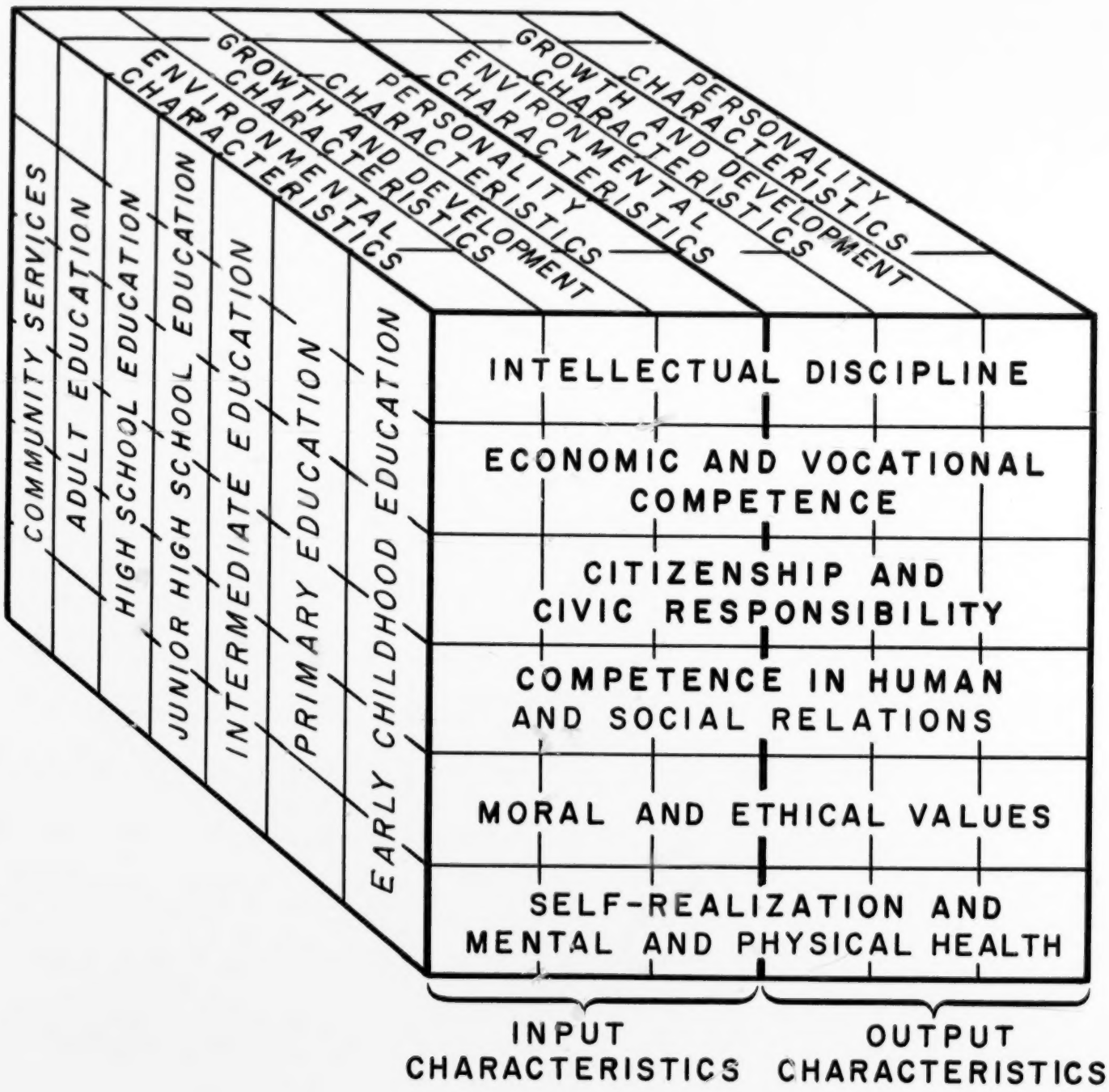

(3.0.) ORGANIZATIONAL PROGRAMS
(3.1.) EARLY CHILDHOOD EDUCATION PROGRAMS
(3.1.1.) CHILD CARE PROGRAMS
(3.1.2.) NURSERY PROGRAMS
(3.1.3.) KINDERGARTEN PROGRAMS
(3.2.) PRIMARY EDUCATION PROGRAMS
(3.2.1.) FIRST GRADE PROGRAMS
(3.2.2.) SECOND GRADE PROGRAMS
(3.2.3.) THIRD GRADE PROGRAMS
(3.3.) INTERMEDIATE EDUCATION PROGRAMS
(3.3.1.) FOURTH GRADE PROGRAMS
(3.3.2.) FIFTH GRADE PROGRAMS
(3.3.3.) SIXTH GRADE PROGRAMS
(3.4.) JUNIOR HIGH SCHOOL EDUCATION PROGRAMS
(3.4.1.) SEVENTH GRADE PROGRAMS
(3.4.2.) EIGHTH GRADE PROGRAMS
(3.5.) HIGH SCHOOL EDUCATION PROGRAMS
(3.5.1.) NINTH GRADE PROGRAMS
(3.5.2.) TENTH GRADE PROGRAMS
(3.5.3.) ELEVENTH GRADE PROGRAMS
(3.5.4.) TWELFTH GRADE PROGRAMS
(3.6.) ADULT EDUCATION PROGRAMS
(3.6.1.) CULTURAL ENRICHMENT PROGRAMS
(3.6.2.) CAREER COMPETENCIES DEVELOPMENT PROGRAMS
(3.6.3.) COUNSELING & GUIDANCE PROGRAMS
(3.6.4.) AVOCATIONAL SKILL DEVELOPMENT PROGRAMS
(3.6.5.) SPECIAL ADULT PROGRAMS
(3.7.) COMMUNITY SERVICE PROGRAMS
(3.7.1.) SOCIETAL SERVICES PROGRAMS
(3.7.2.) RECREATIONAL SERVICE PROGRAMS
(3.7.3.) SPECIAL COMMUNITY SERVICE PROGRAMS

Figure 19. A Two-Level Branching Network of Organizational Programs

Figure 20

AN ADAPTIVE FRAMEWORK FOR EDUCATIONAL DECISION MAKING



The basic form of the adaptive framework is a three-dimensional matrix having 6 x 6 x 7 = 252 structural units. In its expanded form there are 152 x 559 x 30 = 2,848,910 structural units. This number of structural units offer an almost unlimited potential for the handling of relevant planned educational system change data and information. Thus, the adaptive framework provides a core design for the development of a management information system for public education.

The author does not wish to present this form of the adaptive framework as the "best" alternative for school districts to adopt. Rather, it offers a pattern that can be followed in the development of adaptive frameworks for individual school districts. The number of sub-dimensions selected for inclusion in the primary form of the matrix should vary with the unique desires and needs of individual districts.

3.0 ORGANIZATIONAL PROGRAMS

3.1 Early Childhood Education Programs
- 3.1.1 Child Care Programs
- 3.1.2 Nursery Programs
- 3.1.3 Kindergarten Programs
- 3.1.4 Program Support Services*
  - 3.1.4.1 personnel support services
  - 3.1.4.2 operational support services
  - 3.1.4.3 managerial support services
  - 3.1.4.4 instructional support services

3.2 Primary Education Programs
- 3.2.1 First Grade Programs
- 3.2.2 Second Grade Programs
- 3.2.3 Third Grade Programs
- 3.2.4 Program Support Services
  - 3.2.4.1 personnel support services
  - 3.2.4.2 operational support services
  - 3.2.4.3 managerial support services
  - 3.2.4.4 instructional support services

3.3 Intermediate Education Programs
- 3.3.1 Fourth Grade Programs
- 3.3.2 Fifth Grade Programs
- 3.3.3 Sixth Grade Programs
- 3.3.4 Program Support Services
  - 3.3.4.1 personnel support services
  - 3.3.4.2 operational support services
  - 3.3.4.3 managerial support services
  - 3.3.4.4 instructional support services

3.4 Junior High School Education Programs
- 3.4.1 Seventh Grade Programs
- 3.4.2 Eighth Grade Programs
- 3.4.3 Program Support Services
  - 3.4.3.1 personnel support services
  - 3.4.3.2 operational support services
  - 3.4.3.3 managerial support services
  - 3.4.3.4 instructional support services

3.5 High School Education Programs
- 3.5.1 Ninth Grade Programs

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*For a detailed breakout of program support services see Donald R. Miller and Sheldon S. Varney Plans for Restructuring School District Organization (Burlingame, California: OPERATION PEP, 1970).

- 3.5.2 Tenth Grade Programs
- 3.5.3 Eleventh Grade Programs
- 3.5.4 Twelfth Grade Programs
- 3.5.5 Program Support Services
  - 3.5.5.1 personnel support services
  - 3.5.5.2 operational support services
  - 3.5.5.3 managerial support services
  - 3.5.5.4 instructional support services

3.6 Adult Education Programs
- 3.6.1 Cultural Enrichment Programs
- 3.6.2 Career Competencies Development Programs
- 3.6.3 Counseling and Guidance Programs
- 3.6.4 Avocational Skill Development Programs
- 3.6.5 Special Adult Programs
- 3.6.6 Program Support Services
  - 3.6.6.1 personnel support services
  - 3.6.6.2 operational support services
  - 3.6.6.3 managerial support services
  - 3.6.6.4 instructional support services

3.7 Community Service Programs
- 3.7.1 Societal Service Programs
- 3.7.2 Recreational Service Programs
- 3.7.3 Special Community Service Programs
- 3.7.4 Program Support Services
  - 3.7.4.1 personnel support services
  - 3.7.4.2 operational support services
  - 3.7.4.3 managerial support services
  - 3.7.4.4 instructional support services

An Alternative Breakout for Organizational Programs*

3.1 Early Childhood Education Programs
- 3.1.1 Education Programs for 3-year-olds
- 3.1.2 Education Programs for 4-year-olds
- 3.1.3 Education Programs for 5-year-olds
- 3.1.4 Education Programs for 6-year-olds
- 3.1.5 Program Support Services
  - 3.1.5.1 personnel support services
  - 3.1.5.2 operational support services
  - 3.1.5.3 managerial support services

3.2 Primary Education Programs
- 3.2.1 Education Programs for 6-year-olds
- 3.2.2 Education Programs for 7-year-olds
- 3.2.3 Education Programs for 8-year-olds

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*This breakout is suggested for use in those school districts which favor a non-graded approach to instruction.

3.2.4 Education Programs for 9-year-olds
3.2.5 Program Support Services
3.2.5.1 personnel support services
3.2.5.2 operational support services
3.2.5.3 managerial support services
3.2.5.4 instructional support services
3.3 Intermediate Education Programs
3.3.1 Education Programs for 9-year-olds
3.3.2 Education Programs for 10-year-olds
3.3.3 Education Programs for 11-year-olds
3.3.4 Education Programs for 12-year-olds
3.3.5 Program Support Services
3.3.5.1 personnel support services
3.3.5.2 operational support services
3.3.5.3 managerial support services
3.3.5.4 instructional support services
3.4 Junior High School Education Programs
3.4.1 Education Programs for 12-year-olds
3.4.2 Education Programs for 13-year-olds
3.4.3 Education Programs for 14-year-olds
3.4.4 Program Support Services
3.4.4.1 personnel support services
3.4.4.2 operational support services
3.4.4.3 managerial support services
3.4.4.4 instructional support services
3.5 High School Education Programs
3.5.1 Education Programs for 14-year-olds
3.5.2 Education Programs for 15-year-olds
3.5.3 Education Programs for 16-year-olds
3.5.4 Education Programs for 17-year-olds
3.5.5 Education Programs for 18-year-olds
3.5.6 Education Programs for 19-year-olds
3.5.7 Program Support Services
3.5.7.1 personnel support services
3.5.7.2 operational support services
3.5.7.3 managerial support services
3.5.7.4 instructional support services
3.6 Adult Education Programs
3.6.1 Cultural Enrichment Programs
3.6.2 Career Competencies Development Programs
3.6.3 Counseling and Guidance Programs
3.6.4 Avocational Skill Development Programs
3.6.5 Special Adult Programs
3.6.6 Program Support Services
3.6.6.1 personnel support services
3.6.6.2 operational support services
3.6.6.3 managerial support services
3.6.6.4 instructional support services
3.7 Community Service Programs
3.7.1 Societal Service Programs
3.7.2 Recreational Service Programs
3.7.3 Special Community Service Programs
3.7.4 Program Support Services

3.7.4.1 personnel support services
3.7.4.2 operational support services
3.7.4.3 managerial support services
3.7.4.4 instructional support services

CHAPTER IV

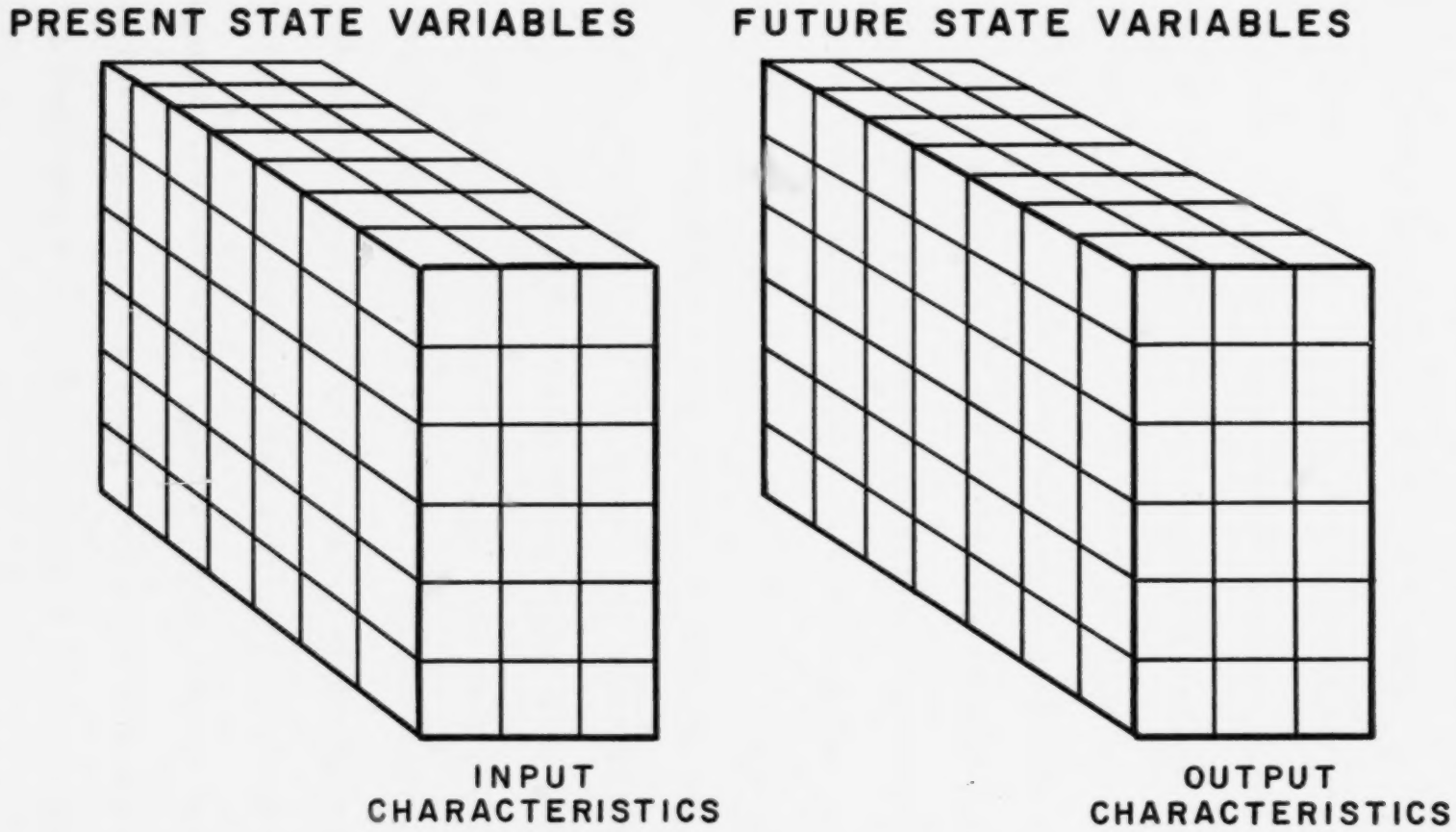
USE OF THE ADAPTIVE FRAMEWORK IN PLANNED SYSTEM CHANGE

The three-dimensional matrix form of adaptive framework developed in regard to public education and educational management can be used as a system approach tool for effecting planned educational change. Because it is oriented to educational goals, change characteristics of individual learners and organizational programs, it can be used to develop both educational programs as well as instructional systems. The basic three-dimensional matrix can be divided into halves and, thereby, provides two matrices which possess different orientations (Figure 21). One half is oriented to input characteristics which can be regarded as present state variables for purposes of system and/or program development. The other half is oriented to output characteristics which can be regarded as future state or goal variables for system and/or program development purposes.

The primary problem in effecting planned systematic change should be now immediately apparent--preparing system descriptions of present and future state variables. Although many assessment and appraisal tools can be used to secure complete, accurate, relevant, factual and valid data and information regarding the present state, this is not true relative to the preparation of future state descriptions. Since educational goals can be expected to remain fairly stable through time, they offer a more or less common referent for the definition of present and future state

Figure 21

APPLICATION OF THE ADAPTIVE FRAMEWORK IN SUPPORT OF CHANGE AND/OR RENEWAL DECISIONS



CHANGE AND/OR RENEWAL CHARACTERISTICS INCLUDE:

ISSUES • ALTERNATIVES • CONSEQUENCES • PROBLEMS
GOALS AND OBJECTIVES • PLANS AND STRATEGIES • PROCEDURES

variables. Change characteristics can be expected to vary with time as functions of mental and physical growth and development, personality development and changes in the environment.

Future state descriptions must be based on current societal trends and forecasts of probable future societal states, situations and conditions. For organizational program and/or instructional system development purposes, the desired future state variables must be defined in terms of valued output characteristics of individual learners and educational goals. An appraisal of valued output characteristics and educational goals will facilitate the conceptualization, simulation and testing of future organizational programs which will be necessary to fulfill future output requirements. After the future state variables have been defined, present state variables are defined in corresponding terms. By comparing and/or contrasting the present and future state variables and descriptions, relevant discrepancies for change can be identified, analyzed and defined.

Realizing that future state variables are goals and that, to the degree attained, they will be incorporated as part of the system and/or the program, the adaptive framework provides a comprehensive analytical structure for the design and/or study of change. Relevant system and/or program change characteristics and variables can be appraised in terms of educational issues, alternatives, contingencies, consequences, problems, goals and objectives, plans and strategies and procedures.

When the adaptive framework is used as a component in a system approach to instructional system design, its application requires human creativity, ingenuity, intuition and insight. As a methodology, a system approach is sensitively dependent upon the competencies, backgrounds, training and experiences of the people who apply it and upon the inputs

they can bring to bear. It is a tool and it must be realized that as a tool its most serious limitations reside in the people who use it in system analysis, synthesis and evaluation.

A goal-oriented and learner-centered instructional system focuses upon societal change requirements and individuals' potentialities, goals and life needs. The most important design aspect of the system is provision for life-long learning and change on the part of each individual. It is essential that the entire system be made self-regulating through the use of verifiable performance objectives and feedback control processes. An instructional system must be designed to facilitate continuous learner progress toward societal and individual goals that are valid, relevant, feasible, acceptable and reliable.

Evaluation of progress must be made relative to standards that are consistent with normal physical and mental growth and development patterns in children. Such standards can be held only tentatively since each individual's potentialities, goals, needs and desires will change as he grows, develops and experiences new situations and conditions. Further, new knowledges reduce human uncertainties regarding the future and expose new opportunities for the individual and new requirements for societal and individual change. In addition, each individual's capabilities for responsible self-direction, self-evaluation and self-correction change as functions of mental growth and development. Therefore, an instructional system must be designed as a flexible and adaptive social unit that can accommodate a variety of valid and relevant learning states, situations and conditions and a wide range of individual differences.

An instructional system has four major subsystems; namely, regulation, renewal, production and maintenance and support. Each of these subsystems

can be characterized by its specific activities which transform system inputs into desired system outputs. Since production in an instructional system focuses upon changing the behavior of individual learners, it is designed and managed so that specific input behavioral characteristics are efficiently and effectively transformed into prespecified output behavioral characteristics. The relevant input and output behavioral qualities of individual learners can be defined as an array of growth and development, personality and environmental characteristics. The change process must be managed to assure that satisfactory levels of quality are maintained in performance and achievement.

The renewal subsystem must be designed as an adaptive mechanism which will enable the system to make continuous adjustments in its strategic plans, practices, performance and outputs. The maintenance and support subsystem is designed to maintain and support the dynamic aspects of organizational functioning. In an instructional system, this subsystem would maintain and support the production, regulation and renewal subsystems as well as itself.

The regulation subsystem is designed as a policy-making and feedback-control mechanism to insure that system performance will be goal directed and to assure that the nature and quality of system outputs will be consistent with purposes according to plans. The subsystem, consisting of many alternative feedback control loops arranged in a dynamic network, is designed to facilitate the transfer of output information back across the feedback loops in the network so that it can be combined with input information. This feedback transfer function enables all interim actions and results to be iterated and/or checked against explicit purposes, policies and plans. Feedback information is used to appraise the adequacy

of achievements and determine performance efficiency and effectiveness. It is used also to raise questions, to reveal the unexpected, to expose new alternatives, to find and formulate problems, to appraise relevant relations and actions and to refine strategic plans.

Control is a complex management function that permits inputs to be managed and conserved toward the achievement of prespecified purposes and outputs according to plan. Among the activities included in the control function are: establishing standards for performance and outputs; executing plans and strategies in a timely manner; directing, organizing and coordinating actions; supervising and monitoring human activity; reporting progress in achievement; comparing progress to plans and purposes; estimating variance in practices, performance and outputs; adjusting performance through corrective action; and revising purposes, plans and strategies.

Instructional system processes are managed using prespecified organizational control elements which include: (1) policy decisions, (2) system requirements, (3) output and performance specifications and criteria, (4) objectives, (5) plans and strategies and (6) procedures. Each feedback control element is used by management as a quality assurance mechanism to establish, for each desired change in learner characteristics, acceptable output achievement levels and/or expected levels of verifiable proficiency. The prerequisite entry, enabling and evaluative states, situations and conditions of performance are appraised prior to, during and after performance. Progress, achievement and proficiency are measured using criterion-referenced tests that are designed in terms of prespecified verifiable performance objectives.

An adaptive framework for public education and educational management

is one element in a system approach to planned educational system change. It provides a means by which relevant change parameters can be appraised in terms of present and probable future state variables. The development of an adaptive framework is a necessary prerequisite to the construction of alternative strategies for planned system change.